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REPORT OF FLOOD, TROPICAL STORM AGNES, JUNE 1972. SUMMARY REPOR--ETC(U)
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REPORT OF FLOOD

TROPICAL STORM AGNES

JUNE 1972

SUMMARY REPORT

U.S. ARMY ENGINEER DISTRICT, BUFFALO

AUGUST 1973

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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Floods
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Storm Damage

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report focuses attention on the damage caused by "Agnes" to all affected areas within the Buffalo District. The information herein contains preciptiation and weather synopses furnished by National Weather Service, provissional stage and discharge data furnished by the United States Geological Survey and damage estimates obtained by Field reconnaissance by Buffalo District personnel and the Soil Conservaiton Service during and after the flood.

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COVER PHOTO

Looking upstream at Mount Morris Lake as of 24 June 1972.

FRONTISPIECE

Mount Morris Dam during Hurricane "Agnes". Looking along axis of dam at water elevation 755.75, which is 4.25 feet below the spillway crest. Photo taken 25 June 1972.

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PHOTO CREDITS

Corps of Engineers, Buffalo District, frontispiece and figures 1, 2, 8, 9, 21, 27, 28, 37, and 41 through 46.

New York State Department of Environmental Conservation, figures 10, 11 and 25.

Buffalo Courier Express, figures 6, 7 and 13.

Ithaca Journal, figures 30 and 31.

Pete's Sunoco Service, figure 24.

Richard E. Neal, Photographer, figures 12, 14 through 19 and 22.

Rochester Democrat and Chronicle, figure 4.

Syracuse Herald, figures 32, 33, 34, 35, 38, 39 and 40.

Unknown, figures 23 and 36.

Wahl's Photo Service, Cover photo and figures 3, 5, 26 and 29.

Wellsville Daily Reporter, figure 20.

FLOOD SITUATION

This final report of flooding in the Buffalo District that occurred during June 1972 is made in accordance with Engineering Manual 500-1-1 dated 4 January 1972. Specific instructions are contained in paragraph 72.73 of that document. Separate reports for the Genesee River Basin and Oswego River Basin have also been prepared.

The situation that existed in the Buffalo District area was considered to be a Category A flood because there was major flooding in large areas, extensive property damage, and serious danger to life and flood protective works. The loss of one life was attributed to "Agnes" within the Buffalo District. That occurred in the Genesee River Basin. Twenty-six counties were declared disaster areas in the Buffalo District as a result of "Agnes" and are shown on Plate 1. They are the Counties of Allegany, Cattaraugus, Cayuga, Chautauqua, Chemung, Livingston, Madison, Monroe, Oneida, Onondaga, Ontario, Oswego, Schuyler, Seneca, Steuben, Tompkins, Wayne, Wyoming and Yates in New York State; the Counties of Crawford, Erie, and Potter in the Commonwealth of Pennsylvania and the Counties of Ashtabula, Cuyahoga, Lake and Lorain in the State of Ohio.

The first action taken by Buffalo District in Ohio was to dispatch resident office personnel into the field to assist local efforts wherever possible and to report events of the storm to the Buffalo office. Particular attention was given to the effects of the wind on the Cleveland Harbor area. In New York, personnel were dispatched to Wellsville and the Finger Lake area to aid flood fighting efforts wherever possible.

When it became apparent that a major disaster was imminent an Emergency Operations Center was set up at the Buffalo District Office. The Center was open 24 hours a day from 21 June to 28 June; 15 hours a day from 29 June to 7 July; 12 hours a day from 8 July to 18 July;

9 hours a day from 19 July to 29 July; and 8 hours a day from 30 July to mid October. The center was open seven days a week from 21 June to 29 July and six days a week from 30 July to mid October.

Initially the center was used as a means of communication and information exchange between the Buffalo District and areas affected by flooding. After the initial flooding, the center served as the coordinating area for missions assigned to the Buffalo District by the Office of Emergency Preparedness (OEP).

Operation of Mount Morris Dam became of paramount importance when the possibility of overtopping became evident. Rather than allow the spillage of debris, which reportedly included large propane tanks, over the spillway of the dam, the outflows from the dam were increased by opening more gates resulting in a debris-free regulated discharge in the lower Genesee River Valley. The Buffalo District had previously issued a press release and notified the Civil Defense Directors of the potential flood danger. Maps identifying the flooded areas were supplied by the Buffalo District to the New York State Police and the Civil Defense Officer. Sufficient warning time was given before the gates were opened. Hourly surveillance of the flooded area and communication and coordination with State and local agencies was maintained. To minimize potential flood damage, Buffalo District aided local efforts in the placement of sandbag dikes in low lying areas in Brighton and Henrietta. Figures 1 and 2 show a protective embankment built along the Genesee River in Brighton-Henrietta area.

Chicago, Detroit, Kansas City, Rock Island, Sacramento, and St. Paul Districts dispatched additional civilian personnel to the Buffalo District, and military personnel were obtained from West Point and Fort Belvoir to assist in performing missions assigned to Buffalo District from OEP. Area office personnel remained in the field to assist whenever possible to obtain high water marks, flood damage figures, and other pertinent information.

This report focuses attention on the damage caused by "Agnes" to all affected areas within the Buffalo District. The information herein contains precipitation and weather synopses furnished by National Weather Service (N.W.S.), provisional stage and discharge data furnished by the United States Geological Survey (USGS) and damage estimates obtained by field reconnaissance by Buffalo District personnel and the Soil Conservation Service during and after the flood.

Storm of June 1972 ("Agnes")

The most destructive widespread flooding of record over the eastern United States was the result of a tropical depression that developed near Cozumel, off the Yucatan Coast of Mexico on the 15th of June. This depression was to intensify and become Hurricane Agnes by the time its center hit the Florida Panhandle on the afternoon of 19 June. Moving northeast through Georgia and South Carolina, Agnes soon weakened to depression stage. This large, weak depression produced torrential rains in the Carolina mountains on the 20th. Continuing on its northeasterly path, Agnes was rejuvenated to tropical storm stage as it moved closer to the Atlantic near Norfolk, Virginia, on 21 June. Over the Atlantic, the moisture laden Gulf air in Agnes was replenished. Late on the 22nd, the storm center veered westerly and passed over the Southern Tier of New York State where it was absorbed by a broad, deep extra-tropical low pressure system. This large system continued to dominate the weather over the northeast for the next several days. The result of this activity was very heavy rains over most of the northeast.

A "bucket survey" of the Genesee River Basin and Oswego River Basin was made by North Central Division and Buffalo District personnel to determine localized areas of heavy rainfall. A brief meteorologic summary is included for each section of this report.

Plate 2 shows the isohyetal map for "Agnes" over the Buffalo District for the storm period 21-26 June. This map was made using N.W.S. data and the most reliable bucket survey data. The isohyets were drawn with emphasis placed on the N.W.S. data.

Plate 3 shows the path of Agnes from 19-26 June 1972.

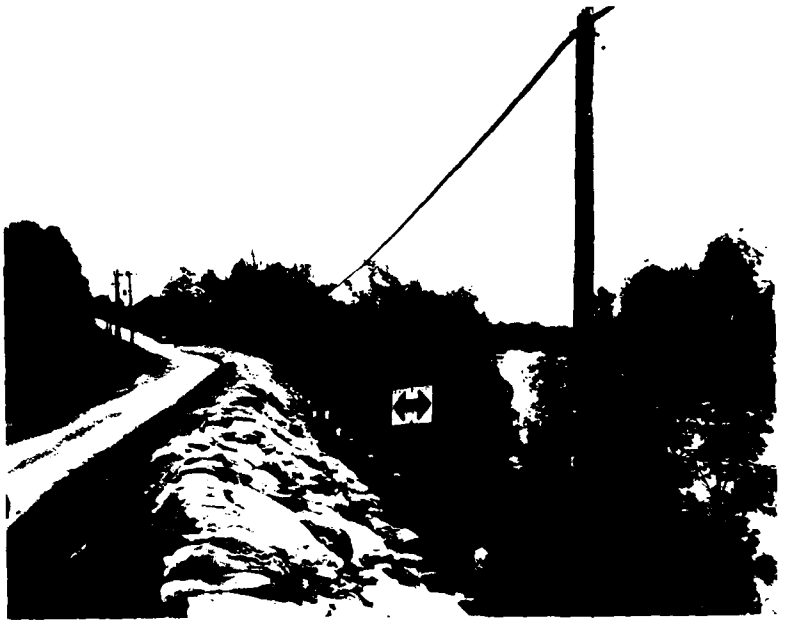
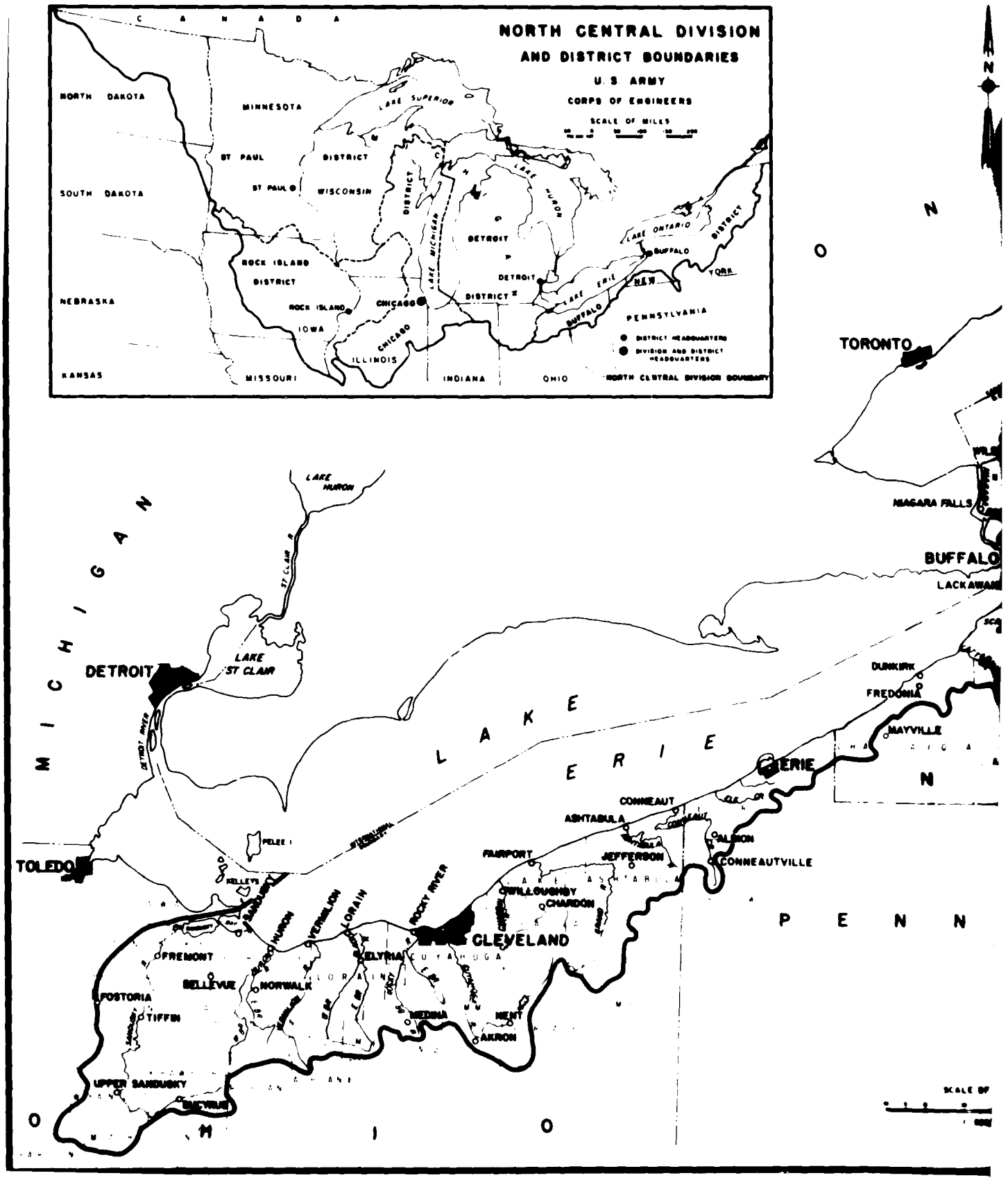


Figure 1 Looking upstream along East River Road at protective embankment. Note Genesee River in right side of photograph.

Figure 2 Looking upstream from Ballantyne Road Bridge at a protective embankment along East River Road. Note Genesee River in the right side of the photograph.

Photos taken 25 June 1972


NORTH CENTRAL DIVISION
AND DISTRICT BOUNDARIES
U. S. ARMY
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SCALE OF MILES
CANADA
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SOUTH DAKOTA
NEBRASKA
KANSAS
MISSOURI
IOWA
ILLINOIS
INDIANA
OHIO
WISCONSIN
MICHIGAN
ST PAUL DISTRICT
ROCK ISLAND DISTRICT
CHICAGO DISTRICT
DETROIT DISTRICT
BUFFALO DISTRICT
NEW YORK
PENNSYLVANIA
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
DISTRICT HEADQUARTERS
DIVISION AND DISTRICT HEADQUARTERS
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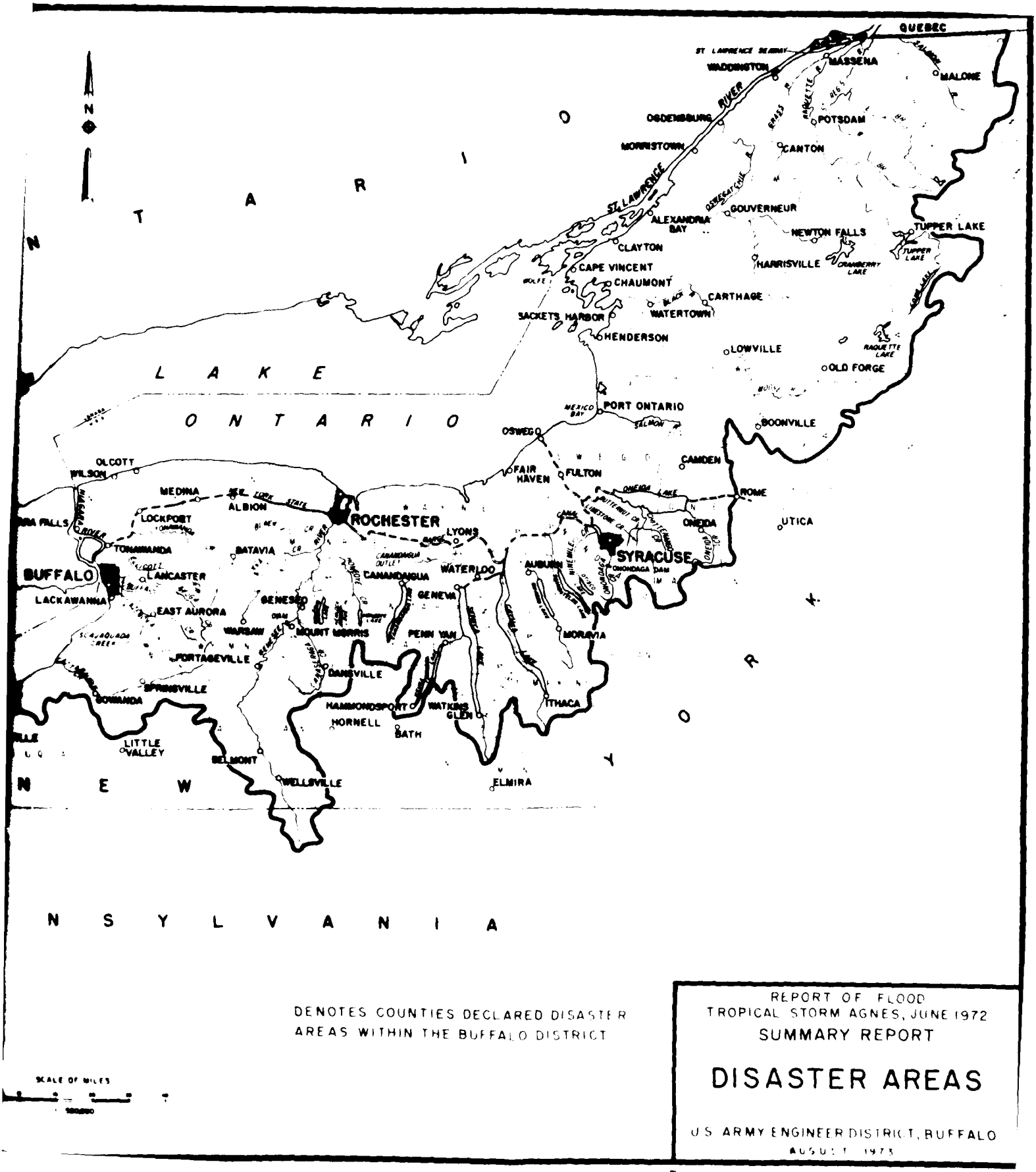


DENOTES COUNTIES DECLARED DISASTER AREAS WITHIN THE BUFFALO DISTRICT

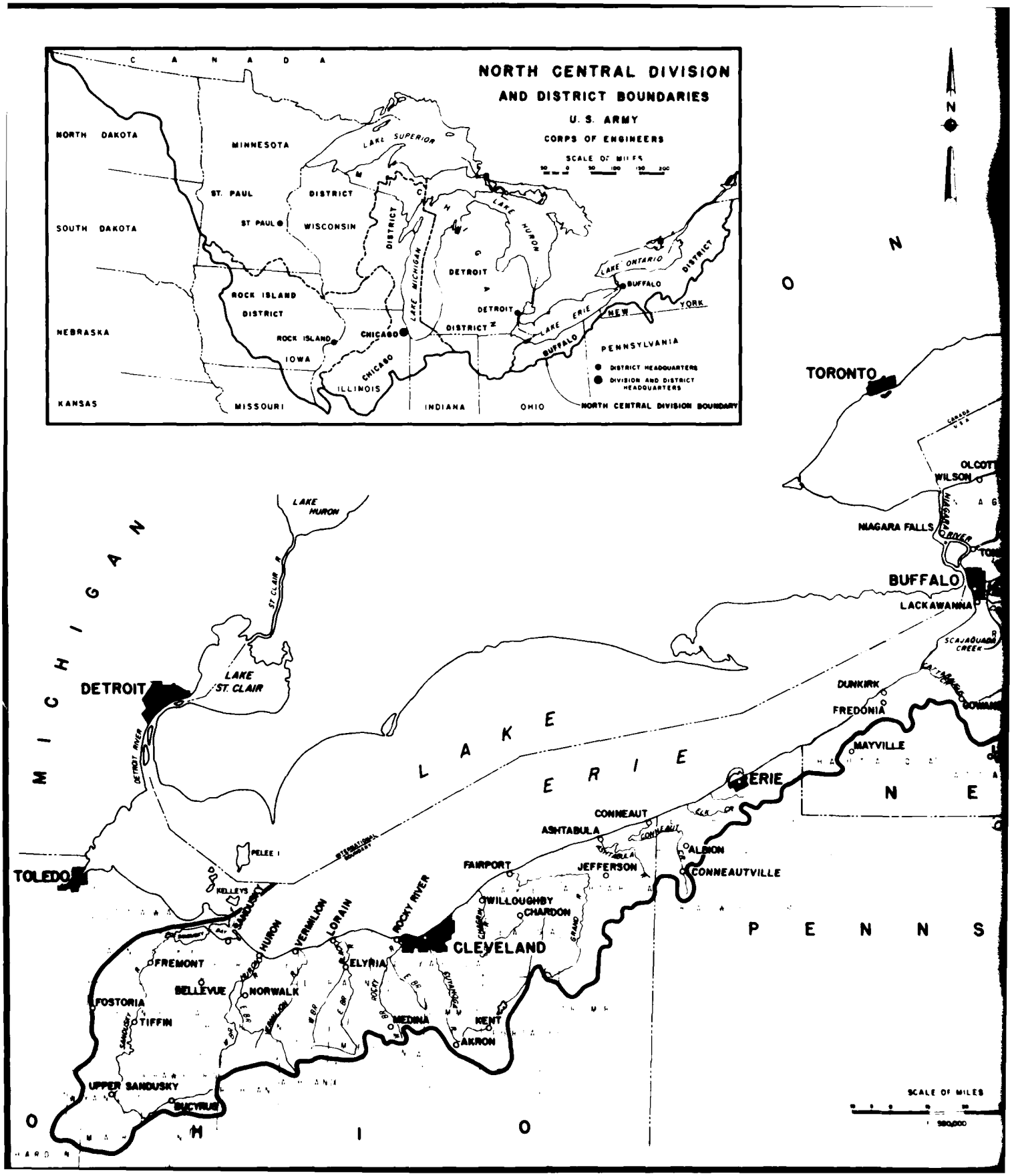
SCALE OF MILES

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT

DISASTER AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE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WISCONSIN
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PENNSYLVANIA
NEW YORK
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NIAGARA RIVER
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SCAJAQUADA CREEK
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MAYVILLE
ERIE
CONNEAUT
ASHTABULA
ALBION
CONNEAUTVILLE
FAIRPORT
JEFFERSON
WILLOUGHBY
CHARDON
CLEVELAND
ELYRIA
MEDINA
KENT
AKRON
NORWALK
FREMONT
BELLEVUE
FOSTORIA
TIFFIN
UPPER SANDUSKY
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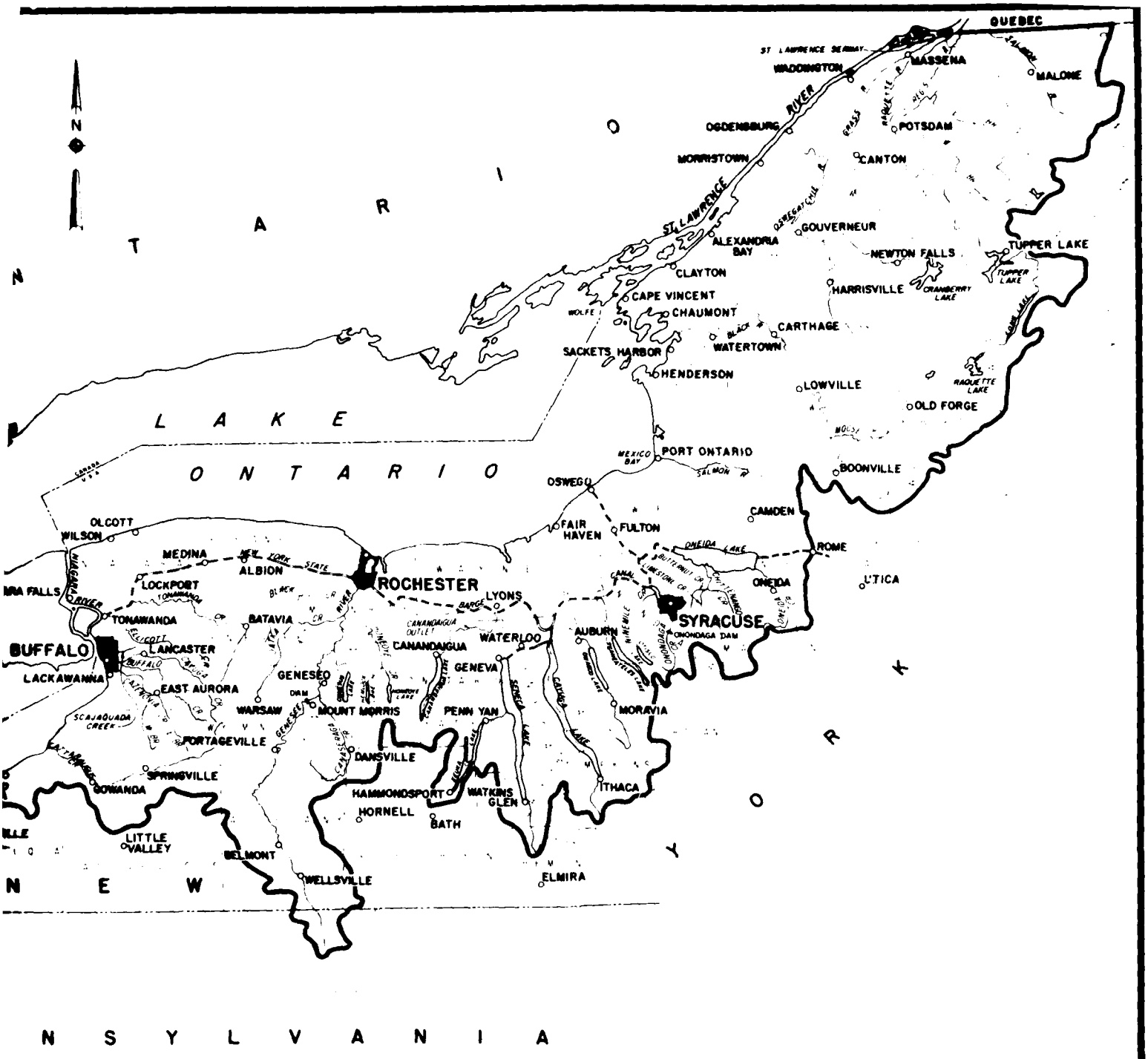

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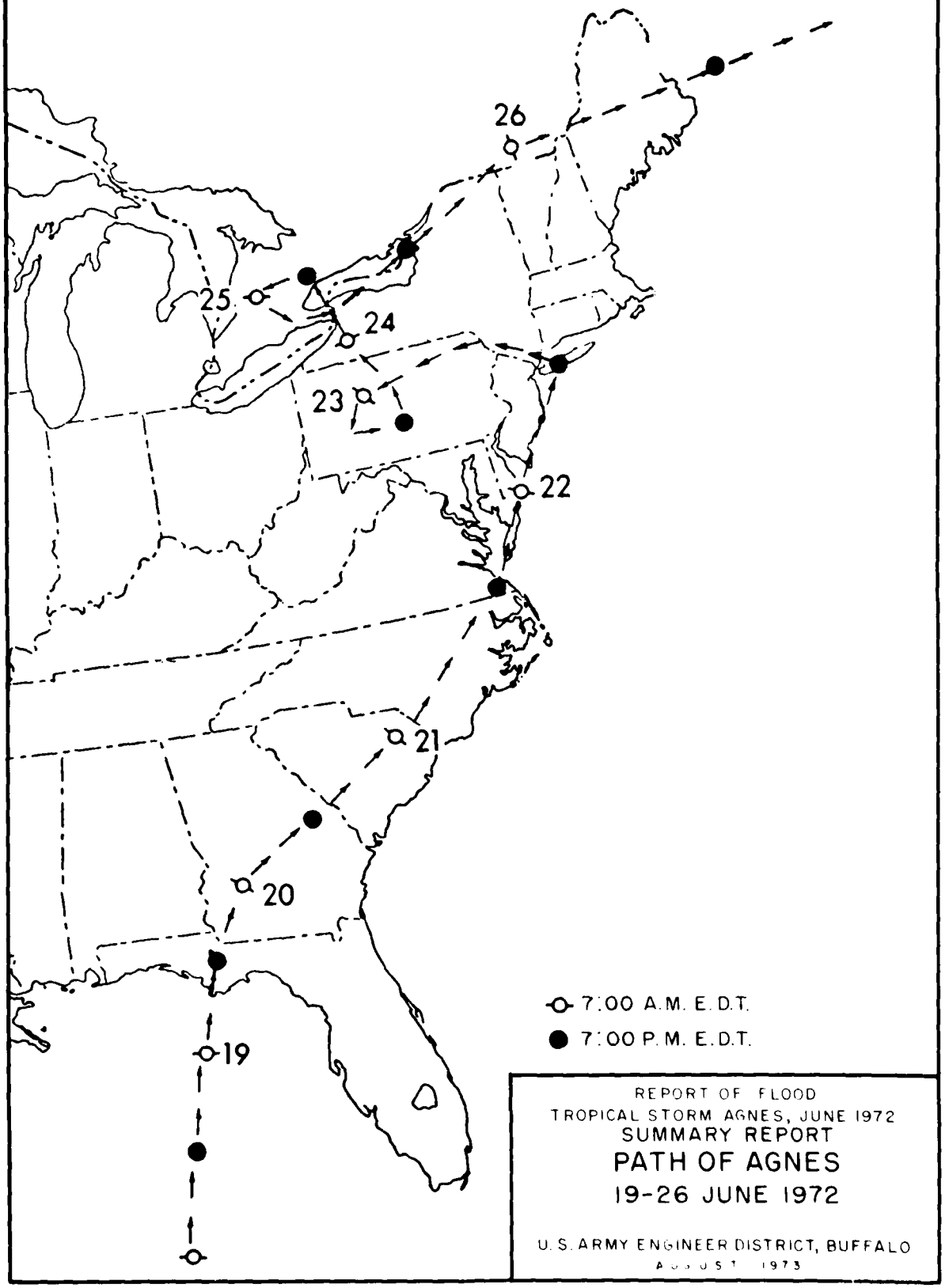
INDICATES INCHES OF PRECIPITATION

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT

ISOHYETAL MAP FOR 21-26 JUNE 1972

U S ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

DRAWING COURTESY DAVID M. LUDLUM, EDITOR WEATHERWISE MAGAZINE, VOL. 25 NO 4, AUG. 1, 1972



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT

PATH OF AGNES
19-26 JUNE 1972

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 3

DAMAGES

After the flood, Buffalo District personnel were sent into the field to assess the amounts and types of flood damages. They extensively interviewed owners of residential and commercial units. Public damage was assessed by inspection of damage survey reports prepared for OEP and by interviewing various public officials and government agencies. Detailed damage analyses were performed for the Genesee River Basin and the Oswego River Basin, and the results may be found in the appropriate "Report of Flood" for the respective basins. Residential losses include all physical damages to structures, contents, flood fighting and cleanup, but land loss is not included. Estimates of damage for commercial enterprises and industries including loss of business profits are grouped together under the heading of "commercial losses." Damages classified as "public and other" include losses to public utilities, public parks, etc. Agricultural damage estimates were prepared by the United States Department of Agriculture, Soil Conservation Service. These damages include crops, land, buildings, livestock, and equipment.

Since the flood covered such a large portion of the Buffalo District, flood characteristics, areas affected and damages sustained will be treated separately and by drainage basins in subsequent paragraphs. As a result of the June storm, water levels in many streams rose to record levels, causing severe damage to many property owners in the flood plain. A total damage estimate for the "Agnes" storm in the Buffalo District is listed in Table 1.

Table 1. - Total Estimated Damages from the June 1972 Flood in the Buffalo District

Location	Private(1)	Public & Other	Agri-cultural	Total
	$	$	$	$
NEW YORK				
Genesee River Basin(2)	11,617,000	23,934,000	14,229,000	49,780,000
Oswego River Basin (2)	8,445,000	11,672,000	30,533,000	50,650,000
Salmon-Perch Basin	(3)	(3)	110,000	110,000
Cattaraugus Basin	(3)	(3)	1,838,000	1,838,000
Chautaqua Basin	(3)	(3)	1,509,000	1,509,000
Tonawanda Basin	(3)	(3)	1,529,000	1,529,000
Black River Basin	(3)	(3)	2,050,000	2,050,000
Niagara-Orleans Complex	(3)	(3)	4,353,000	4,353,000
Wayne-Cayuga Complex	(3)	(3)	3,236,000	3,236,000
Cattaraugus County	(3)	823,000	(5)	823,000
Chautaqua County	(3)	88,000	(5)	88,000
PENNSYLVANIA				
Crawford County	(3)	1,000	(3)	1,000
Erie County	(3)	73,000	(3)	73,000
Potter County	(3)	(5)	(3)	(5)
OHIO				
Ashtabula County	210,000	410,000(4)	(3)	620,000
Cuyahoga County	881,000	3,950,000(4)	(3)	4,831,000
Lake County	378,000	60,000(4)	(3)	438,000
Lorain County	459,000	470,000(4)	(3)	929,000
TOTAL	21,990,000	41,481,000	59,387,000	122,858,000

(1) Includes residential and commercial damage.
(2) Breakdown is available in detail in respective Post Flood Reports.
(3) Insignificant.
(4) Includes damage to harbor structures.
(5) Included in basin totals.

RESULTS OF THE JUNE 1972 STORM

Because of the severity and extent of the June flood, the collection of high water marks, water surface profiles and damages, and flooded area maps were made in greater detail than necessary for more normal flood occurrences. In general, "Agnes" flooding produced record stages and greater damages than any previous flood. It is considered by many to be the most destructive and widespread flood occurrence in the United States. There have been a great number of requests from local governments and individuals for information and assistance concerning tropical storm "Agnes." The high water profiles and flooded area maps, as developed from the June storm are shown in the appropriate sections of this report. They will be useful to local governments along the streams that were affected by the storm event. These data will be valuable to the communities in improving municipal facilities and in planning future development in those areas affected by the June 1972 storm. The Buffalo District of the Corps of Engineers will, upon request, provide technical assistance to Federal, State and local agencies in the interpretation and use of the information contained herein and will provide other available data for flood plain management and their land use.

ESTIMATED DAMAGES PREVENTED BY CORPS OF ENGINEER PROJECTS

There are several Corps projects completed in the Buffalo District. A brief summary of these projects is as follows:

Wellsville, NY - Local channel improvement on the Genesee River and Dyke Creek,

Mt. Morris, NY - Mt. Morris Lake on the Genesee River with a storage capacity of 337,000 acre-feet at spillway crest.

Warsaw, NY - This project consists of local channel improvements on Oatka Creek in the Village of Warsaw.

Tonawanda Creek at Batavia, NY - The project consists of local channel modification of Tonawanda Creek in the vicinity of Batavia.

Cayuga Creek at Lancaster, NY - This local channel improvement project is located in the Villages of Depew and Lancaster on Cayuga Creek.

Syracuse, NY - This project on Onondaga Creek, consists of two sections. One is the Onondaga Reservoir which is located four miles south of Syracuse and the other is 2.1 miles of channel widening, deepening, and straightening of the creek in the southern part of Syracuse (includes improvements at Nedrow).

Montour Falls, NY - This project is located in the Village of Montour Falls just south of Seneca Lake. It consists of works on Catharine Creek and a tributary, Shequaga Creek and is designed to protect the Village of Montour Falls against the flood of record.

Moravia, NY - The project at Moravia consists of improvements along Owasco Inlet, Mill Creek and Dry Creek. It reduces flood stages from Moravia to Owasco Lake.

Geneva, NY - The project consists of channel improvement and bridge work along Marsh Creek just north of Seneca Lake.

Auburn, NY - This project consists of channel improvement from Owasco Lake downstream to the State Dam, modification of the Dam and adoption of a regulation schedule for the Lake.

Ithaca, NY - This project involved major realignment and improment of Cayuga Lake Inlet and a drop structure at the upstream end of the channel improvement. It reduces flood damage in the City of Ithaca.

Table 2 lists damages prevented by these projects.

Table 2. - Estimated Damage Prevented by Corps of Engineers Projects

Project	Total Accumulation to FY 71	FY 72	Total
	$	$	$
Tonawanda Creek at Batavia, NY	4,298,000	162,000	4,460,000
Cayuga Creek at Lancaster, NY	1,648,000	242,000	1,890,000
Genesee River at Wellsville, NY	598,000	6,487,000	7,085,000
Genesee River at Mt. Morris, NY	20,529,000	210,000,000(1)	230,529,000
Marsh Creek at Geneva, NY	124,000	46,000	170,000
Owasco Inlet at Moravia, NY	327,000	100,000	427,000
Owasco Lake at Auburn, NY	354,000	5,026,000	5,380,000
Onondaga Creek at Nedrow, NY	367,000	93,000	460,000
Onondaga Dam at Syracuse, NY	1,846,000	370,000	2,216,000
Montour Falls, NY	1,103,000	400,000	1,503,000
Cayuga Inlet at Ithaca, NY	533,000	1,375,000	1,908,000
Oatka Creek at Warsaw, NY	0 (2)	280,000	280,000
TOTAL	31,727,000	224,581,000	256,308,000

NOTE: There are several clearing and snagging projects for which economic analyses are not available.

(1) The damage prevented on the lower Genesee River Basin is attributed to Mt. Morris Lake, which protects the urbanized downstream communities.

(2) Project was completed in July 1968 and has not been subject to damaging flows until June 1972.

ESTIMATED DAMAGES TO CORPS OF ENGINEERS PROJECTS

While all of the Corps of Engineers projects contributed to the reduction of flood damage, several of them were damaged. Table 3 below lists the estimated damages.

Table 3. - Estimated Damages to Corps of Engineers Projects

Project Name	Estimated Damages
	$
Mount Morris Dam at Mount Morris, NY	1,478,000 (1)
Oatka Creek at Warsaw, NY	31,000
Genesee River and Dyke Creek at Wellsville, NY	355,000
Camillus-Nine Mile Creek, NY	27,000
Hammondsport-Glen Brook, NY	14,000
Ithaca-Cayuga Lake Inlet, NY	600,000
Jordan-Skaneateles Lake Outlet, NY	5,000
Montour Falls - Seneca Lake, NY	18,000
Moravia-Owasco Lake Inlet, NY	32,000
Port Byron-Owasco Lake Outlet, NY	22,000
Weedsport-Skaneateles Lake Outlet, NY	10,000
TOTAL	2,592,000

(1) There was no physical damage to the dam. The entire cost was for debris removal from the dam upstream to the south end of Letchworth State Park.

ACTIVITIES OF OTHER AGENCIES

General

Close coordination between local, State, and Federal agencies having disaster responsibilities eased the situation and reduced the amount of inconvenience resulting from tropical storm "Agnes." A summary of the activities of the agencies which provided major disaster and relief assistance to the communities is listed in subsequent paragraphs.

Federal Agencies

Department of Agriculture

Surplus food and food stamps were made available to relief organizations. Services to meet the emergency need of the disaster-stricken farmers were made through emergency loans.

The Soil Conservation Service (SCS) gave technical assistance to flood-stricken farmers and assessed agricultural damage in the Oswego River Basin. The SCS, Syracuse Office, provided the data on agricultural damages used in this report.

Department of Commerce

The National Weather Service, National Oceanic and Atmospheric Administration, had the responsibility of forecast and warning for river flooding on the Genesee River.

Military

Personnel and equipment from the U. S. Army, Coast Guard, Navy and National Guard were provided to many communities throughout the disaster area. Major duties included security and traffic control,

evacuation, rescue, and resupply by helicopter and boat, cleanup, communication support, and damage assessment.

Department of Health, Education and Welfare

The Food and Drug Administration assisted State and local governments in the inspection of damaged food supplies for contamination from flood waters. Assistance was also given in emergency health activities and sanitation.

Department of Housing and Urban Development (HUD)

HUD-owned housing was provided to many families whose homes were destroyed by flood waters. Trailers were available for up to one year to allow people to rebuild their homes.

Office of Emergency Planning (OEP)

OEP provided assistance to political subdivisions to alleviate the effects of disaster by making funds available for the emergency protective works constructed to protect the public and private property, restore essential community facilities after the flood and remove debris from public and private property, restore where a health hazard was present. Damage Survey teams were comprised of personnel from the Corps of Engineers, Environmental Protection Agency, Department of Transportation and New York State Department of Environmental Conservation.

Small Business Administration (SBA)

SBA established field offices in a number of communities for the purpose of making their program available to flood victims. Long term loans were provided for repairing or rebuilding residential units, business and commercial places and industrial plants damaged by the storm.

Department of Transportation

The Federal Highway Administration provided assistance in restoring roads and bridges on the Federal Aid System.

U. S. Geological Survey (USGS)

During and after the flood, USGS went into the field and collected stream flow data for the flood.

State Agencies

State Department of Agriculture (NYSDA)

NYSDA assisted the USDA in the survey of crop damage.

Civil Defense

State civil defense offices located in each county established communications with damaged areas and coordinated requests for assistance. CD offices in undamaged areas were on alert in order to provide assistance as necessary. The Federal Department of Civil Preparedness Agency supplied counties with essential flood fighting equipment.

Department of Environmental Conservation (DEC)

Personnel from DEC worked with Federal representatives in preparing damage survey reports and final inspection of work. The Western Regional Office in Buffalo assisted in preparing a frequency analysis of tropical storm "Agnes" in the Genesee River Basin.

State Department of Transportation (NYSDOT)

NYSDOT committed personnel and equipment tc keep roads and bridges open and clear from debris (to the extent possible).

Ohio Department of Natural Resources

Personnel of the Department of Natural Resources made a survey of the damaged areas.

State Police

State police provided early warning of rising flood conditions, traffic control and rerouted traffic.

County Agencies

Highway Department

Personnel and equipment fought flood waters to maintain traffic flow on emergency supply routes and provided repair of roads and bridges.

Other Agencies

Firemen

Personnel and equipment worked many hours on rescue missions, pumping out flooded basements and other essential duties.

Local Police

Early warning of flood condition, traffic control, rerouting traffic, and rescue missions were their primary duties.

Service Groups

The Mennonite Disaster Service, American National Red Cross, The Salvation Army, and other relief disaster assistance organizations established and operated shelters which provided lodging and food to thousands of people throughout the disaster area.

Many individuals not related to service groups provided flood victims with shelter, food, clothing, and helped in the task of clean-up from tropical storm "Agnes.

"AGNES" ENVIRONMENTAL SUMMARY

Floods, often a serious threat to man's existence, are a naturally occurring phenomena that can have far reaching ecological consequences. The flooding caused by "Agnes" in June 1972 in the Genesee, Oswego, Cuyahoga and Chagrin River Basins should not be viewed as being completely destructive to fish, wildlife, and vegetation resources. Instead it must be looked upon as an agent capable of bringing about an abrupt change in the overall composition of the environment.

The Cuyahoga and Chagrin Rivers occupied fringe areas of the storm. These areas experienced similar effects, but to lesser degrees, than the centrally located Genesee River and Oswego River Basins.

The magnitude of this storm was capable of altering the species as well as the habitat distribution of the Basins. Mature flora were more vulnerable to change through devastation while more vulnerable fauna included younger age groups and weaker adults. The impact on the fishery resources included injury or death to many species of fish, death to large populations of invertebrates, turbidity, loss of vegetation, erosion runoff, and in some cases total obliteration of habitat. Conversely, some habitats originally unsuitable to certain species were favorably altered to accommodate these species.

After "Agnes" subsided, operations to clear stream channels of sediment and debris were initiated. However, certain age classes of fish will be eliminated as well as some former habitats. Birds, waterfowl, and mammals lost will be repropogated to former levels by their populations in time. Ecological balance may therefore be upset until populations stabilize in their resettled disturbed environments.

GENESEE RIVER BASIN

General

The Genesee River rises in the Allegany Mountains in Potter County, Pennsylvania, and flows generally north for about 157 river miles to empty into Lake Ontario at Rochester Harbor, NY. The basin shown on Plate 4, has an elliptical shape, with a maximum width, east and west, of about 40 miles and a length of about 100 miles. The total watershed area is 2,479 square miles, of which 1,077 square miles are above Mt. Morris Dam, and 96 square miles are in Pennsylvania. The largest tributary of the Genesee River is Canaseraga Creek, which joins the Genesee River about 4 miles below Mt. Morris Dam, and has a drainage area of 335 square miles. The southern portion of the Genesee River watershed upstream of Mt. Morris Dam is mildly mountainous, while the topography of the northern portion of the basin is gently rolling.

Climatology

A number of water stage recorders are operated by the U. S. Geological Survey in the Genesee River Basin. Gages located in Portageville and Scio were destroyed during the flood and have been replaced at new locations. Tables 4 and 5 compare the June 1972 flood peaks to the maximum previously known flood peaks on the Upper and Lower Genesee River Basin, respectively.

In the Basin the heaviest rainfall occurred over the upper basin. The maximum recorded total storm rainfall was 13.72 inches with a maximum daily amount of 6.57 inches on the 21st at the Wellsville gage. The upper basin average storm total for the period 21-26 June was 10.2 inches. The average basin precipitation was 7.1 inches for the 6-day period. Bucket survey data indicates a maximum amount of 16 inches of rainfall in the upper reaches of Dyke Creek near Andover, NY.

Table 4. - Summary of Peak Stages and Discharges in the Upper Genesee River Basin

Stream and Place Of Determination	Drainage Area (Sq.Mi.)	Period Of Record	Maximum Flood Previously Known: Date	Gage Height (feet)	Discharge (cfs)	Maximum During June 1972 Flood: Day	Gage Height (feet)	Discharge (cfs)
Cryder Creek at Genesee,PA	50.0							6,610
Genesee River at Stannards	179.0						12.2	20,200
Chenunda Cr. at Stannards	30.6							9,200
Dyke Creek at Wellsville	71.4	1955-60 & 64-69	6-15-60	16.10	5,230			12,000
Genesee River at Wellsville	288.0	1955-58	3-8-56	17.65	15,800	23	14.12	38,500
Genesee River at Scio (1)	308.0	1916-72	11-25-50	11.22	23,300	23		(2) 41,300
Vandermark Cr. near Scio	22.0							8,670
Phillips Cr. near Whitney	24.1							5,910
Van Campen Creek at Friendship	45.8	1964-68	9-28-67	13.10	13,400		10.92	9,400
Angelica Creek at Transit Br.	86.5	1964-68	9-28-67	10.28	9,560			8,400
Genesee River at Portage-ville (1)	982.0	1908-72	5-17-16	21.70	44,000	23		(3) 90,000 83,900 (2)
Genesee River at St. Helena	1017.0	1908-50	5-17-16	12.81	44,400			

(1) Recording gage destroyed during June 1972 flood.
(2) Corps of Engineers estimate.
(3) U.S.G.S. estimate

Table 5. - Summary of Peak Stages and Discharges in the Lower Genesee River Basin (1)

Stream and Place Of Determination	Drainage Area (Sq.Mi.)	Period Of Record	Maximum Flood Previously Known: Date	Gage Height (feet)	Discharge (cfs)	Maximum During June 1972 Flood: Day	Gage Height (feet)	Discharge (cfs)
Canaseraga Cr. near Canaseraga	58.2	1964-68	9-28-67	11.10	5,480			12,400
Canaseraga Cr. near Dansville	153.0	1910-12; 1915-70	8-23-40	9.93	9,110	23	14.66	9,600
Canaseraga Cr. at Shakers Crossing	333.0	1915-22; 1958-70	4-26-61	12.07	4,430	23		11,200 (2)
Genesee River at Jones Br.	1,419.0	1903-06; 1908-14; 1915-72	5-17-16; 4-28-54	25.44; 17.75	55,100; 13,800	25	24.50	17,500
Conesus Lake-Lakeville	69.7	1930-72	3-9-56	(2); 11.93		24	(2); 12.44	
Genesee River at Avon	1,666.0	1955-72	3-7-56	37.2	15,600	25	40.63	16,360 (3)
Honeoye Creek at Honeoye	41.1	1963-72	4-15-71	4.72		23	6.94	
Honeoye Cr. at Honeoye Falls	195.0	1945-70	3-28-50	6.42	4,630		6.50	4,800
Oatka Creek at Warsaw	41.9	1963-72	9-28-67	7.28	1,760	23	9.75	4,010
Oatka Creek at Garbutt	204.0	1945-72	3-31-60	8.64	6,920	24	6.89	3,830
Genesee River at Rochester	2,457.0	1904-72	3-30-16; 3-31-60	15.30; 14.91	48,300(6); 25,800	25	15.89	31,300 (4); 25,500 (5)
Black Creek at Churchville	123.0	1945-70	3-31-60	9.44	4,880			750

(1) Unless otherwise noted, all flows on the Lower Genesee River are subsequent to the construction of Mount Morris Dam.
(2) Corps of Engineers estimate.
(3) Reflects temporary shift in stage-discharge relationship.
(4) Affected by fluctuations in the regulation of Court Street Dam.
(5) Estimated flow assuming no influence from Court Street Dam regulation.
(6) Prior to construction of Mount Morris Dam.

Areas Subject to Flooding

The areas subject to flooding along the Genesee River lie in Allegany, Livingston, Monroe and Wyoming Counties in New York and Potter County in Pennsylvania. Plate 4 is an index map of the flooded area maps on the main stem of the Genesee River and Canaseraga Creek.

Flooding in the Canaseraga Valley affects rich agricultural land. It is almost an annual event, and the lower portion of the valley has a flooded area that extends approximately two miles in width, and narrows down to approximately one mile just downstream of Dansville. Flooding above Mount Morris Lake is primarily confined to agricultural areas and small communities. The floodway is narrower than along the Genesee River and flows through a moderately mountainous region. The exception from light residential and agricultural damages in the upper Genesee Valley is the Village of Wellsville. Here the damage extends to residential, commercial, industrial, railroad, utility, and public improvements.

A summary of all damages within the Genesee River Basin is listed in Table 6. Damages estimated are listed separately for the Genesee River, Dyke Creek at Wellsville, lower Canaseraga Creek, Conesus, Hemlock and Honeoye Lakes. The remainder of the estimated tributary damages are listed by county.

A brief description of flood conditions is given for the Lower Genesee River Basin, the Upper Genesee River Basin, Wellsville, Mount Morris Lake, and Canaseraga Creek. A more detailed description can be found in the Report of Flood, "Genesee River Basin."

Table 6. Total Estimated Damage from the June 1972 Flood in the Genesee River Basin

Location	Non-Agricultural			Agricultural (4)	Total
	Private		Public and Other (5)		
	Residential	Commercial			
	$	$	$	$	$
Genesee River	2,081,000	2,224,000	13,953,000	Included	18,258,000
Canaseraga Creek	27,000	37,000	420,000	in	484,000
Dyke Creek at Wellsville	1,056,000	3,261,000	638,000		4,955,000
Conesus Lake	282,000		3,000	County	285,000
Hemlock Lake	(1)		38,000		38,000
Honeoye Lake	129,000		1,000	Totals	130,000
Allegany County, NY	1,965,000		5,701,000	6,315,000	13,981,000
Genesee County, NY	(1)		27,000	504,000	531,000
Livingston County, NY	501,000		1,458,000	2,769,000	4,728,000
Monroe County, NY	20,000		102,000	1,705,000	1,827,000
Ontario County, NY	34,000		218,000	584,000	836,000
Potter County, PA	(2)		27,000	(2)	27,000
Steuben County, NY	(2)		1,191,000	166,000	1,357,000
Wyoming County, NY	(3)		157,000	2,186,000	2,343,000
TOTALS	11,617,000		23,934,000	14,229,000	49,780,000

(1) Assumed negligible
(2) Not available
(3) Included in the Genesee River damage. Remainder of private damage is assumed to be negligible.
(4) Furnished by U. S. Department of Agriculture, Soil Conservation Service.
(5) Includes damages reported to O.E.P.

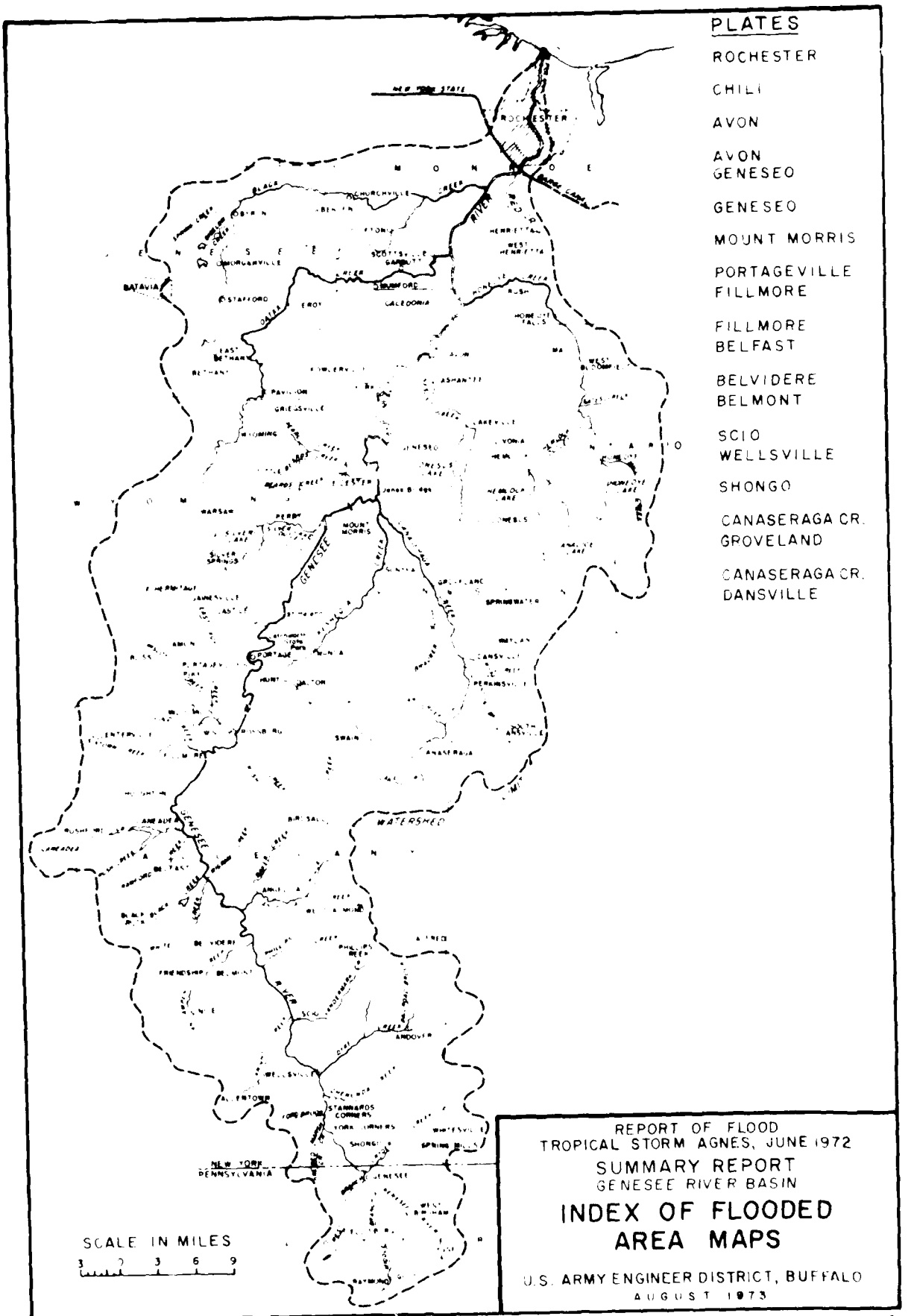

PLATES
ROCHESTER
CHILI
AVON
AVON
GENESEO
GENESEO
MOUNT MORRIS
PORTAGEVILLE
FILLMORE
FILLMORE
BELFAST
BELVIDERE
BELMONT
SCIO
WELLSVILLE
SHONGO
CANASERAGA CR.
GROVELAND
CANASERAGA CR.
DANSVILLE
NEW YORK
PENNSYLVANIA
SCALE IN MILES
3 2 3 6 9
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
GENESEE RIVER BASIN
INDEX OF FLOODED
AREA MAPS
U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 4

THE LOWER GENESEE RIVER BASIN

The lower Genesee River is that portion extending from Lake Ontario upstream to Mount Morris Dam, a distance of about 67 miles. The major communities along this stretch are: the City of Rochester, the Towns of Brighton, Henrietta, Chili, Scottsville, Avon, Geneseo, and Mount Morris. Between Scottsville and Mount Morris, agricultural use of the flood plain is predominant.

There are, at present, eight water stage recorders operated by the U. S. Geological Survey in the lower Genesee River Basin. Of this total, three are located on the lower Genesee River. All eight remained in operation during the June 1972 flood. Table 7 gives pertinent discharge data at the water stage recording sites and in the Chili-Henrietta area.

Based on precipitation gages and a bucket survey made shortly after the flood in the lower Genesee River Basin, it is estimated that an average of 5.68 inches of rain fell from 21 to 26 June. Of this total, approximately 4.5 inches fell from 21 to 23 June.

The area inundated by the June 1972 flood is shown on Plates 5 through 9. Profiles of this flood are shown on Plates 10 and 11. Also shown is the estimated water surface profile, had the Mount Morris Project not been constructed.

Table 7. - Pertinent Discharge Data on the Lower Genesee River for the June 1972 Flood

Site	Drainage Area (sq. miles)	Period of Record	Gage Height (feet)	Instantaneous Peak Flow (cfs)	Approximate Frequency (years)
				31,300 (1)	
Rochester gage	2,457	1952-72 (4)	15.89	25,500 (2)	10
Chili-Henrietta	2,413			25,000	10
Avon	1,983	1955-72	40.63	19,500	20
Avon gage	1,666	1955-72	40.63	16,360 (3)	30
Jones Bridge gage	1,419	1952-72 (4)	24.50	17,500	60

(1) Affected by fluctuation due to the regulation of Court Street Dam.
(2) Estimated flow assuming no influence from Court Street Dam regulation.
(3) Reflects a temporary shift in the stage-discharge relationship.
(4) Subsequent to completion of Mount Morris Dam. Actual period of record extends back to early 1900's.

This was the only time since construction of Mount Morris Dam that it could not provide complete flood protection. The large volume of inflow to the Dam during this flood event made it necessary to release flows that, in combination with Canaseraga Creek outflows, exceeded downstream channel conditions. Consequently, a relatively large discharge was recorded at the Jones Bridge gage. Due to valley storage, the peak flow eventually flattened out as it reached the Avon gage. The increase in flow as recorded at the Rochester gage was due to local runoff. It should be noted that the lower Genesee River would have been flooded by the high outflows of Canaseraga Creek even without the releases from Mount Morris Dam.

Total estimated June 1972 flood damages are given by reaches in Table 8. which follows. Reach limits are shown on flooded area maps.

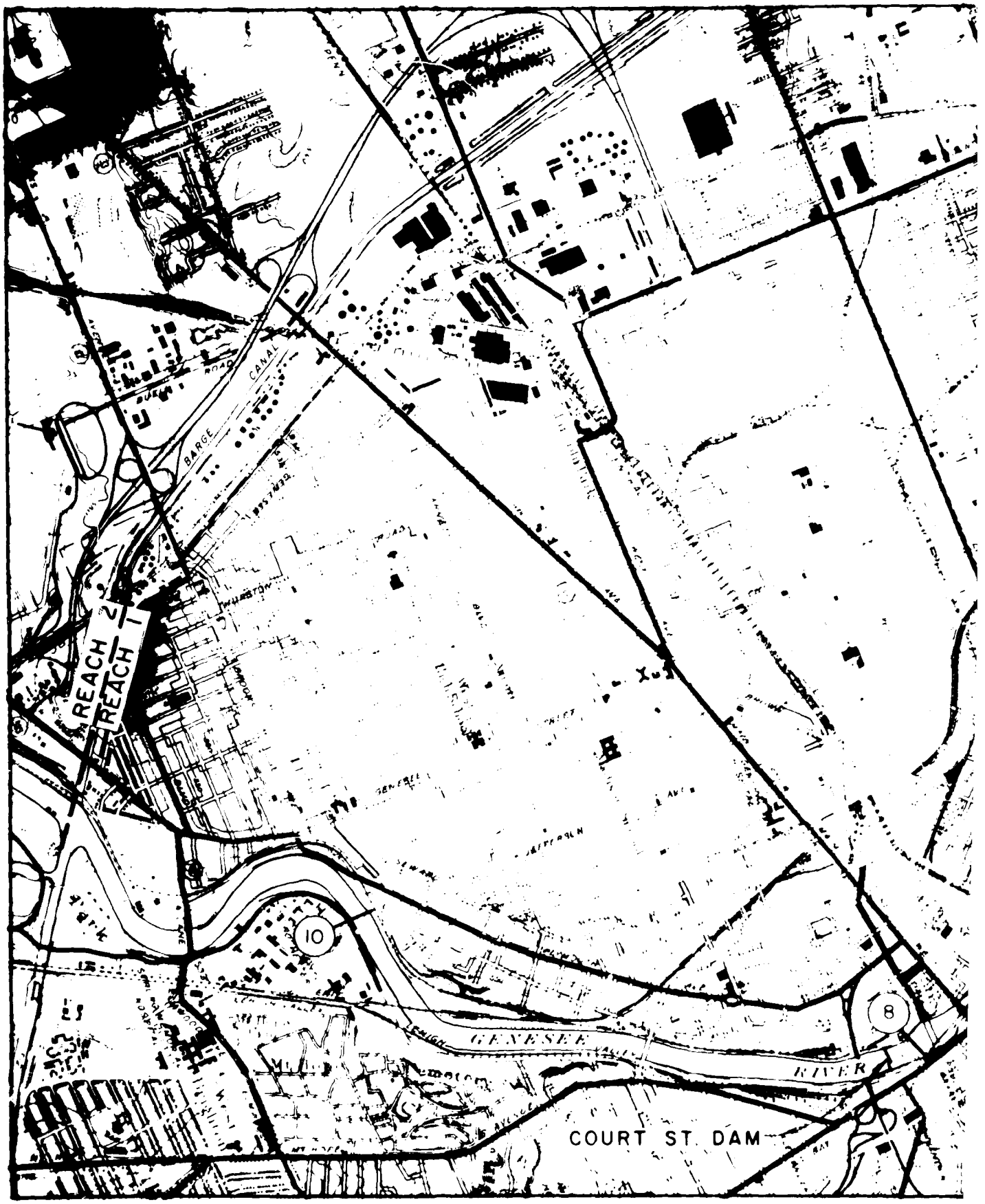
Table 8. - Total Estimated Damages on the Lower Genesee River

Reach	June 1972 Flood Damage				
	Residential	Commercial	Public and Other	Agricultural	Reach Total
	$	$	$	$	$
Rochester			224,000 (1)		224,000
Chili-Henrietta	170,000	65,000	380,000	40,000	655,000
Avon	42,000	275,000	123,000	294,000	734,000
Geneseo	56,000	238,000	232,000	747,000	1,273,000
TOTAL	268,000	578,000	959,000	1,081,000	2,886,000

(1) Damage was not due to overland flooding, but rather to existing river structures and sediment deposits in the river.

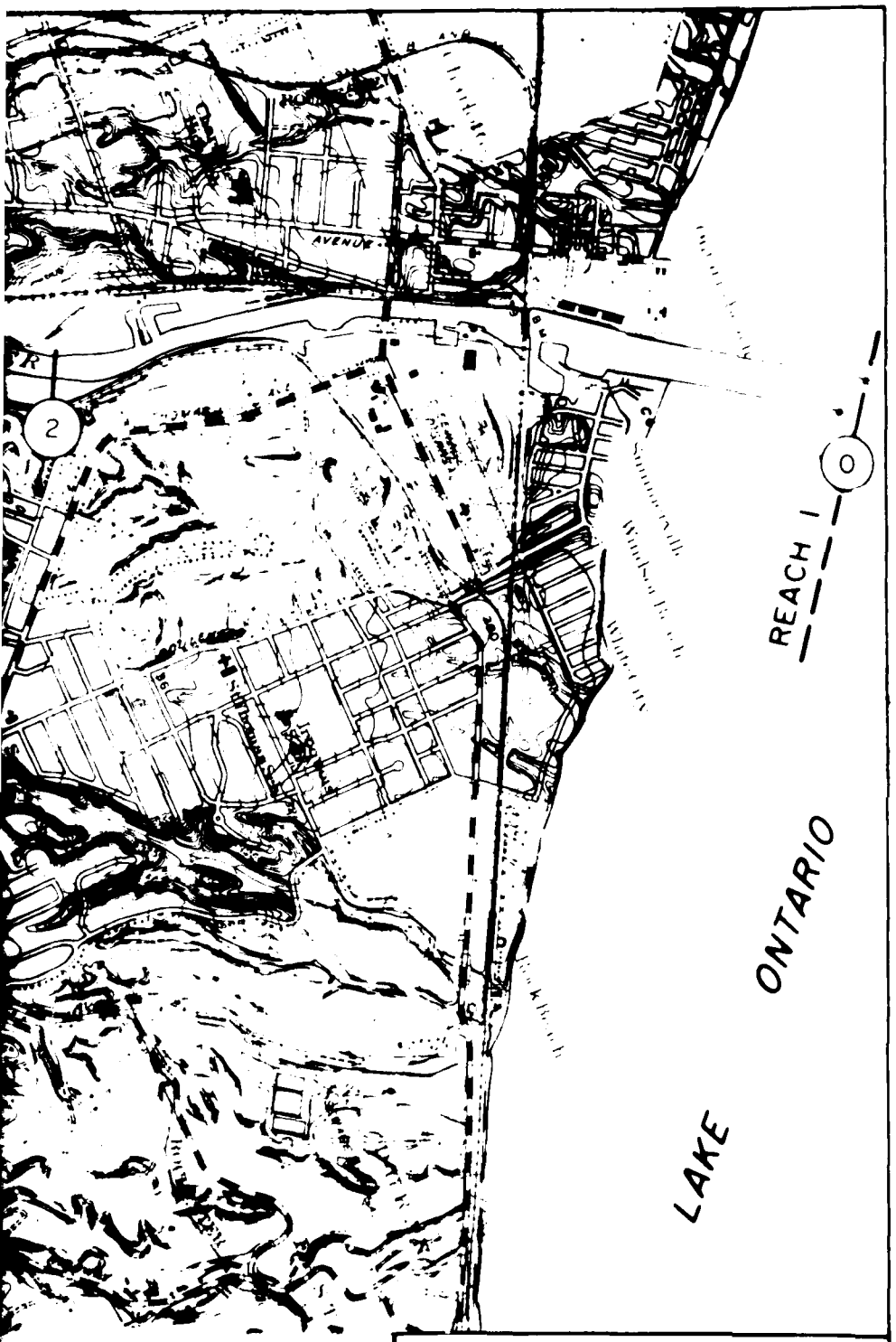
Figures 3 through 5 show flood conditions and results of the June 1972 flooding.

Figure 3 Looking East at Genesee River at River Mile 21. State Rte. 253 is at the right of the photograph.


REACH 2
REACH 1
BARGE CANAL
10
8
GENESEE
RIVER
COURT ST. DAM


I.P.I
GENESEE PARK
Flow
RIVER
6
8
4


RIVER
GENESEE
PARK
4
2
LEGEND:
GAGES AREA
USGS RECORDING GAGE
INDEX POINT REACH 2
20
DISTANCE ABOVE THE MOUTH IN MILES



GEND:

- FLOODED AREA
- U.S.G.S RECORDING GAGE
- I.P.2 INDEX POINT REACH 2
- (20) DISTANCE ABOVE THE MOUTH IN MILES

REPORT OF FLOOD
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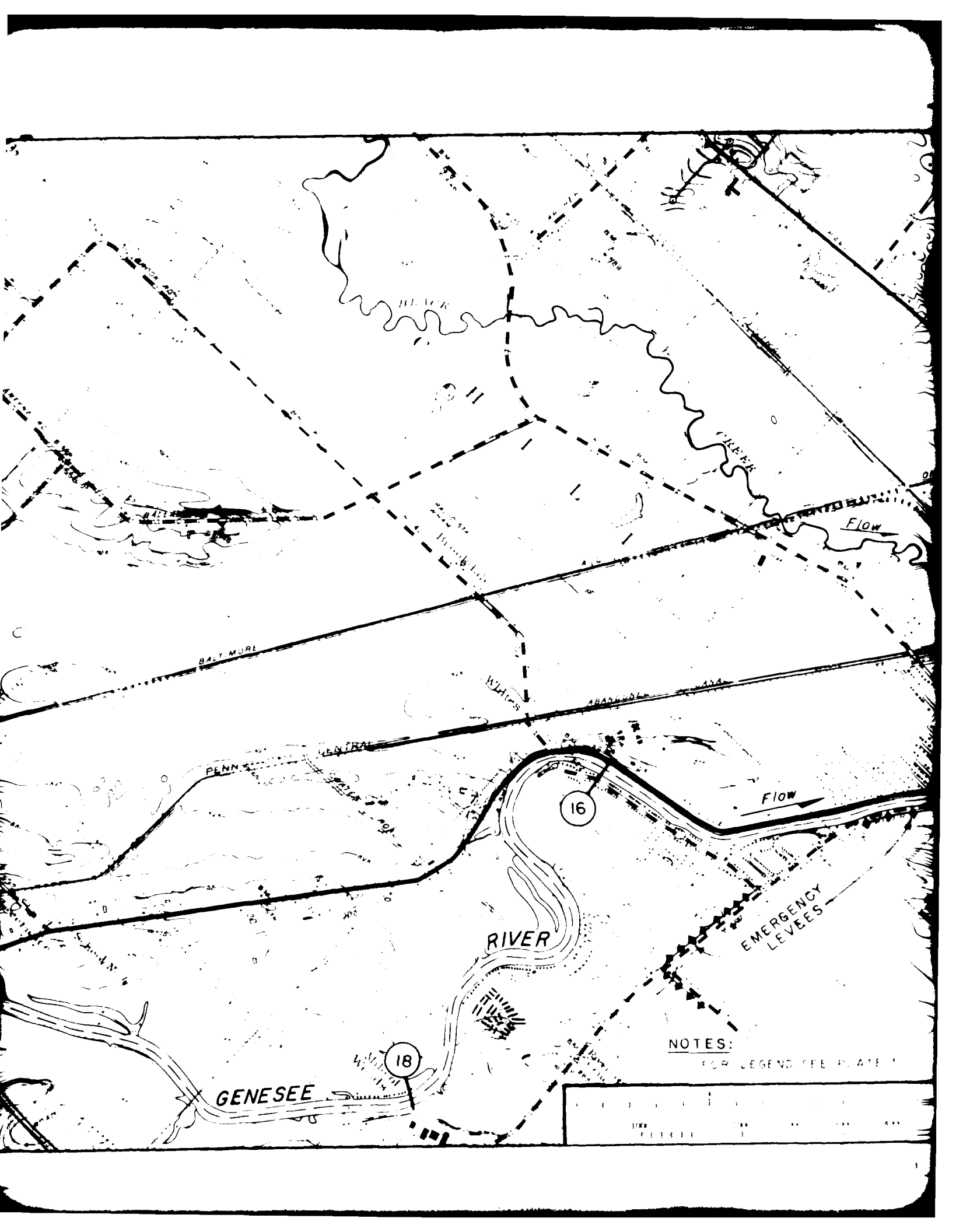
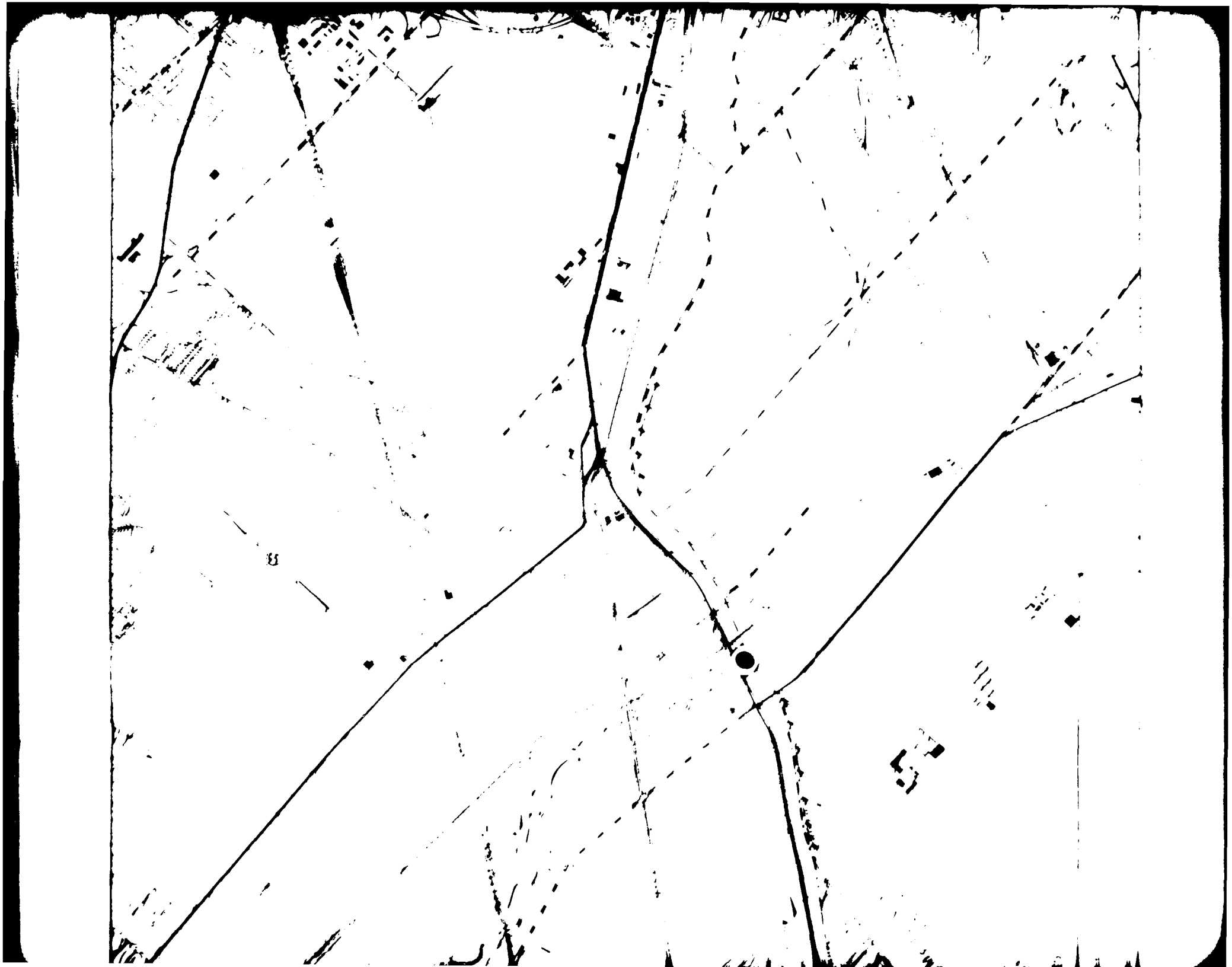
SUMMARY REPORT
LOWER GENESEE RIVER BASIN

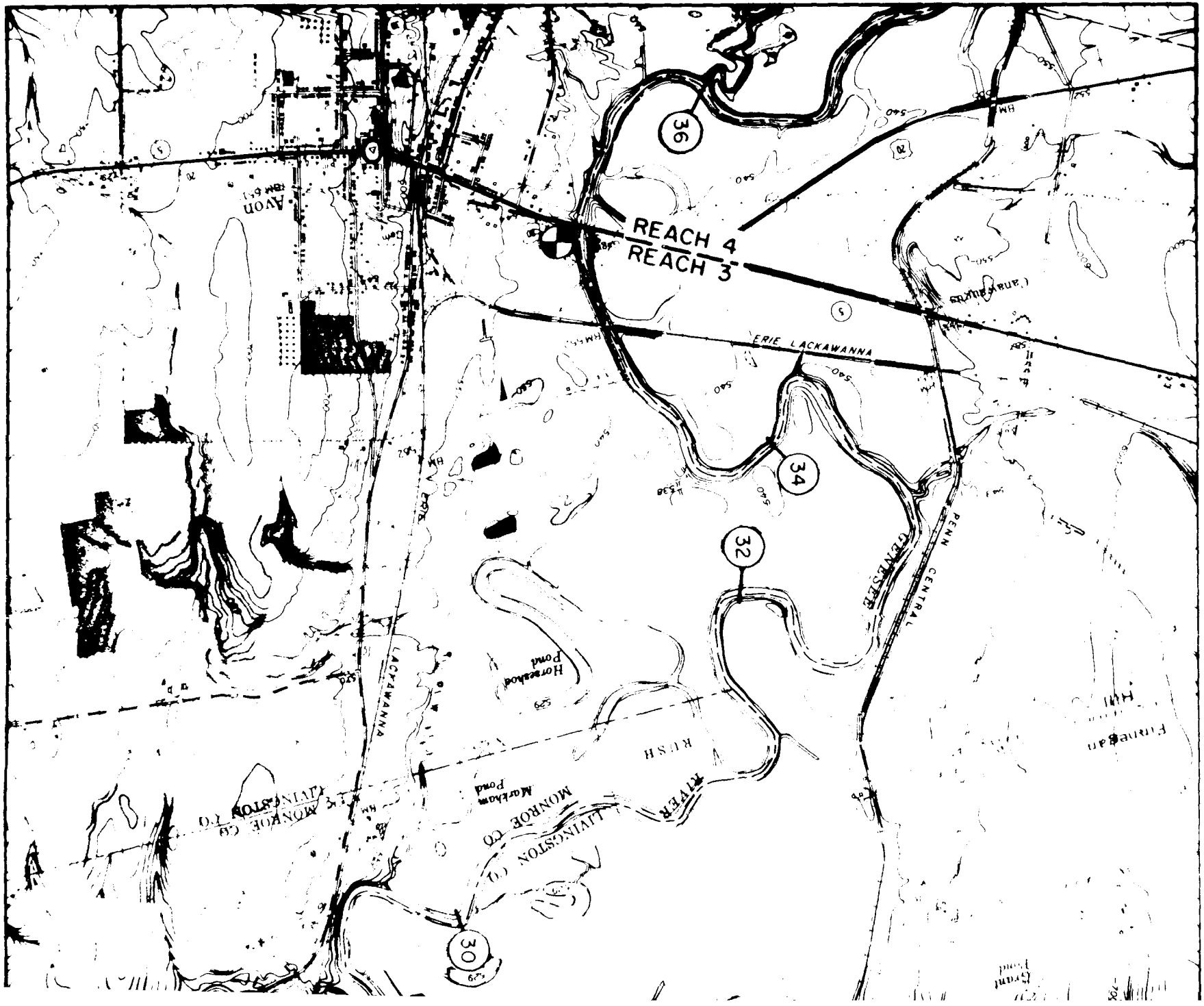
ROCHESTER
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

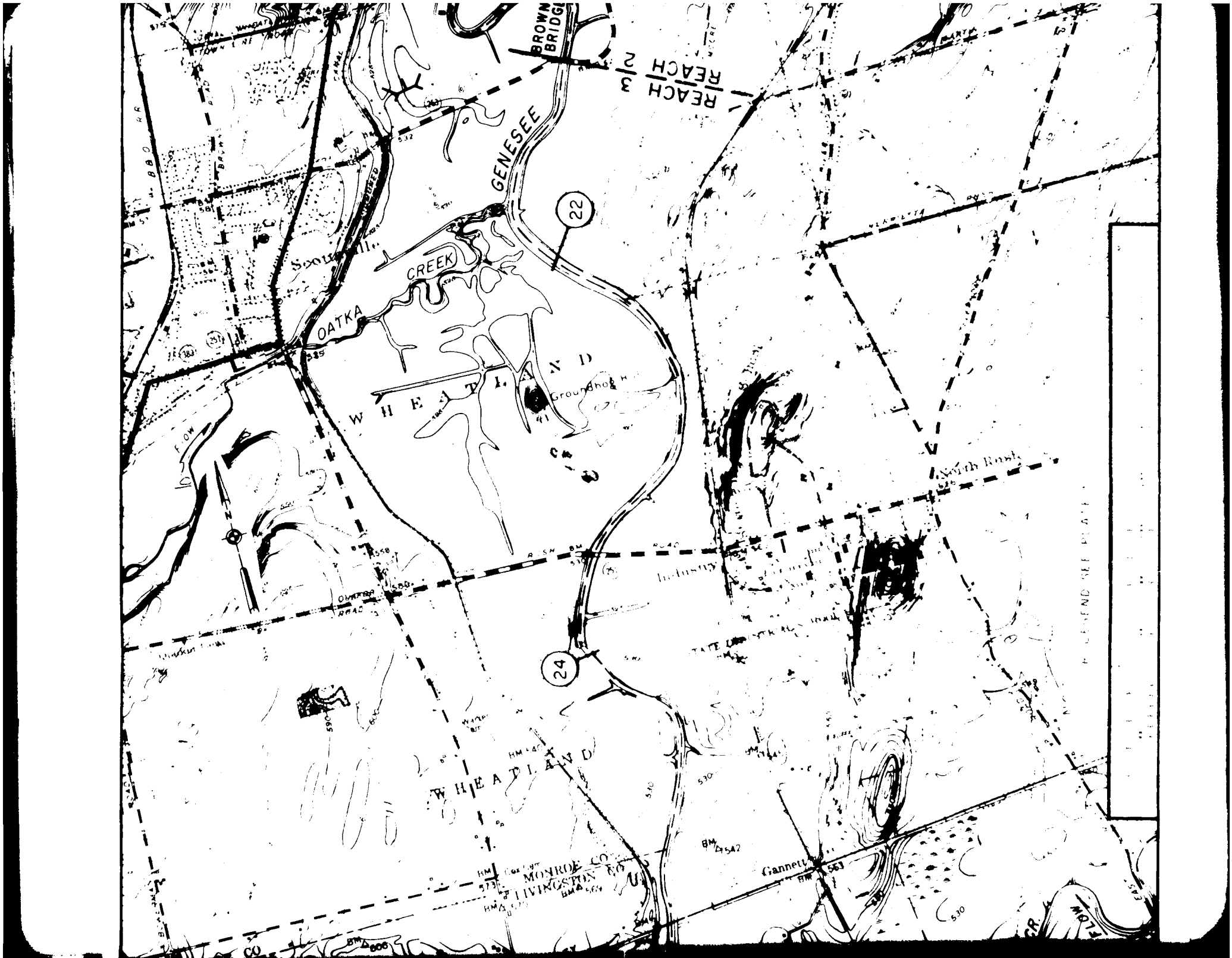

Flow
BALTIMORE
PENN
CENTRAL
16
Flow
EMERGENCY
LEVEES
RIVER
18
GENESEE
NOTES:




REACH 1
REACH 2
Red
SUMMARY REPORT
FLOODED AREAS


REACH 4
REACH 3
36
34
32
30
ERIE LACKAWANNA
PENN CENTRAL
LACKAWANNA
RIVER
Avon
Horseshoe Pond
Mortham Pond
MONROE CO
LIVINGSTON CO


MONROE CO
LIVINGSTON CO
LIVINGSTON CO
CALEDONIA
Dugan
Creek
Low Pond
LEHIGH VALLEY
RIVER
GENESEE
FLOW
FLOW
HONEOYE CR
I.P. 3
26
28
30
Meadow Brook
Davis Hill
Maxwell


REACH 3
REACH 2
BROWN BRIDGE
GENESEE
22
CREEK
OATKA
WHEATLAND
Groundhog
South Road
24
WHEATLAND
MONROE CO.
LIVINGSTON CO.
Gannett
563
530

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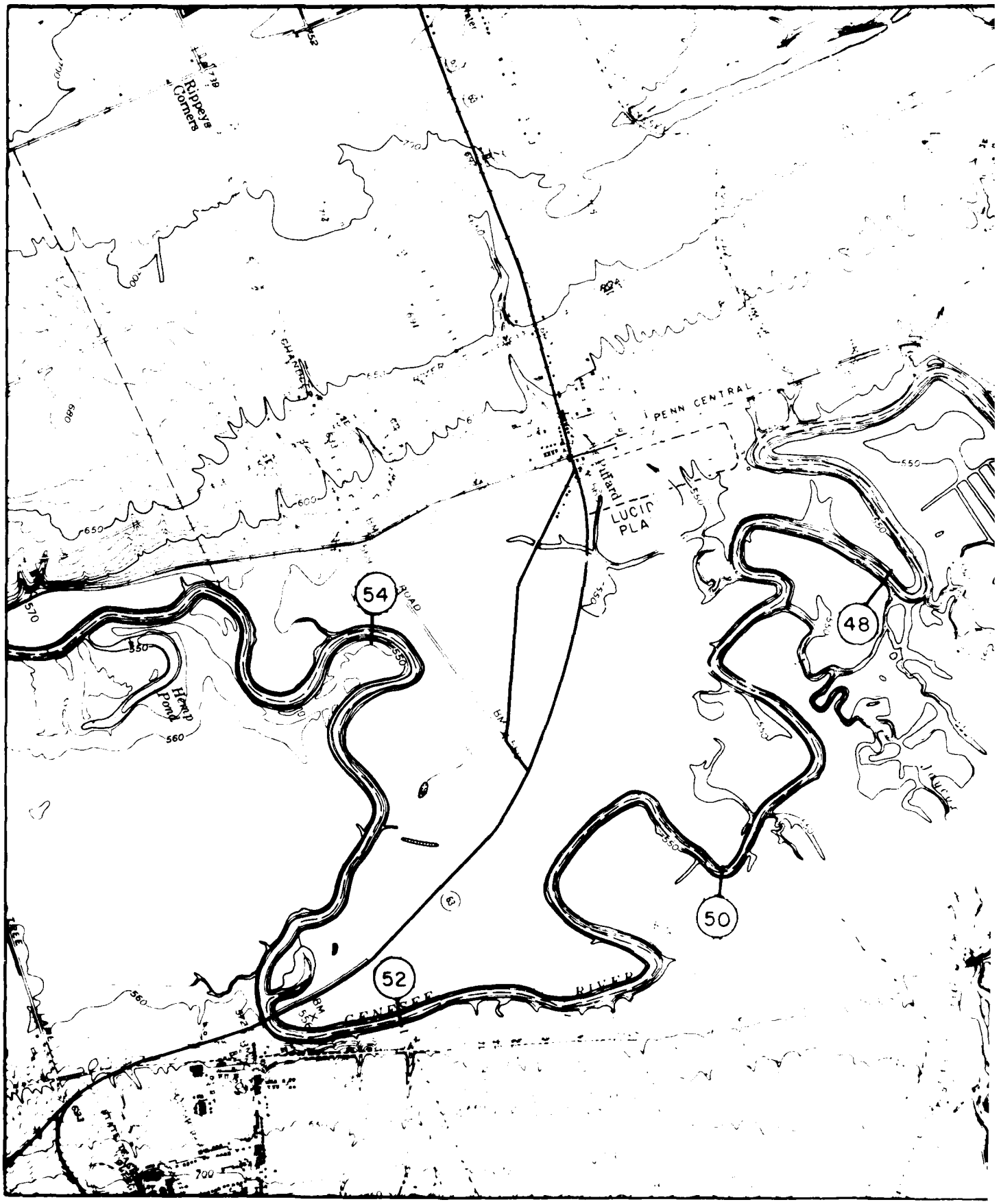
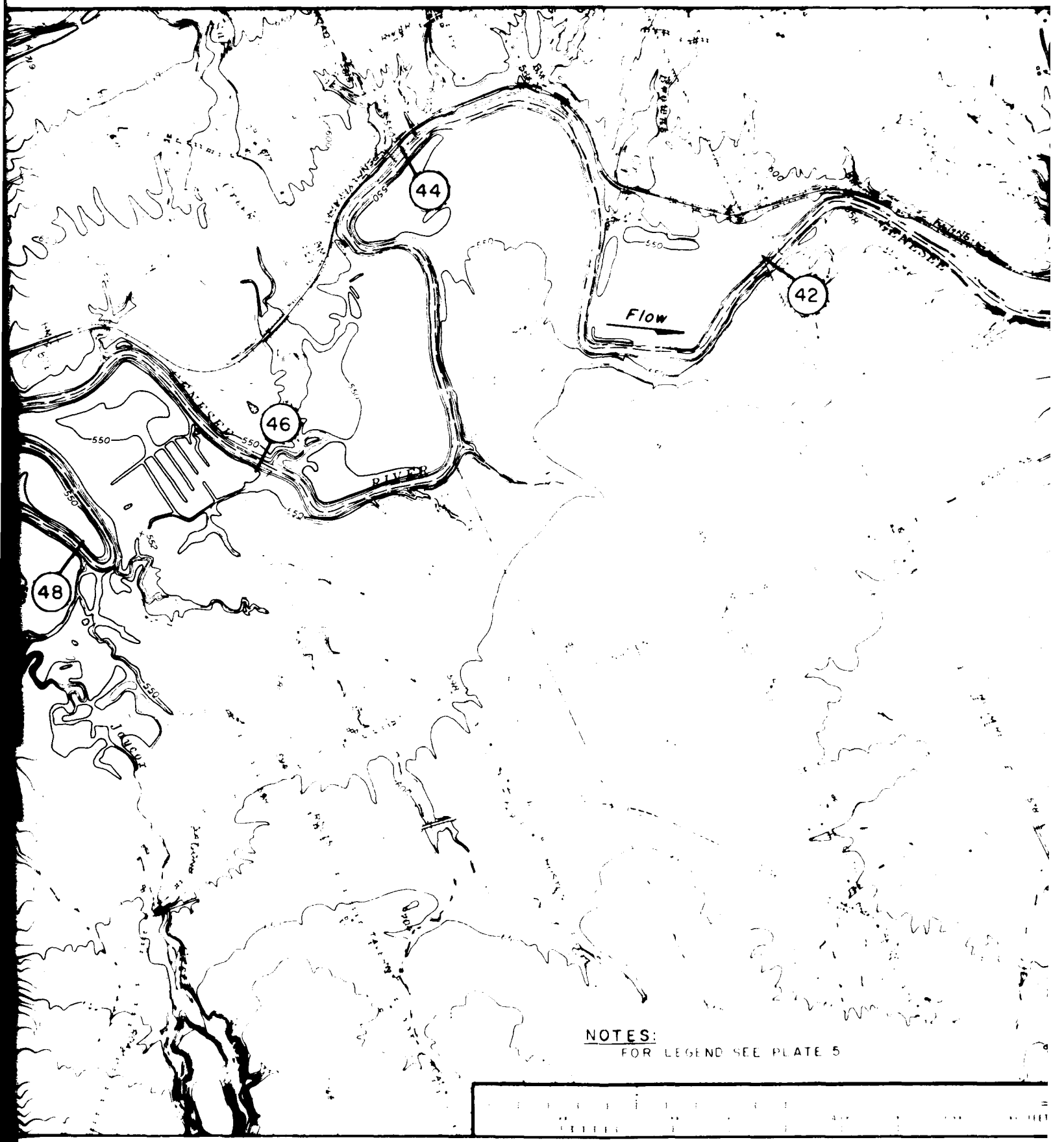
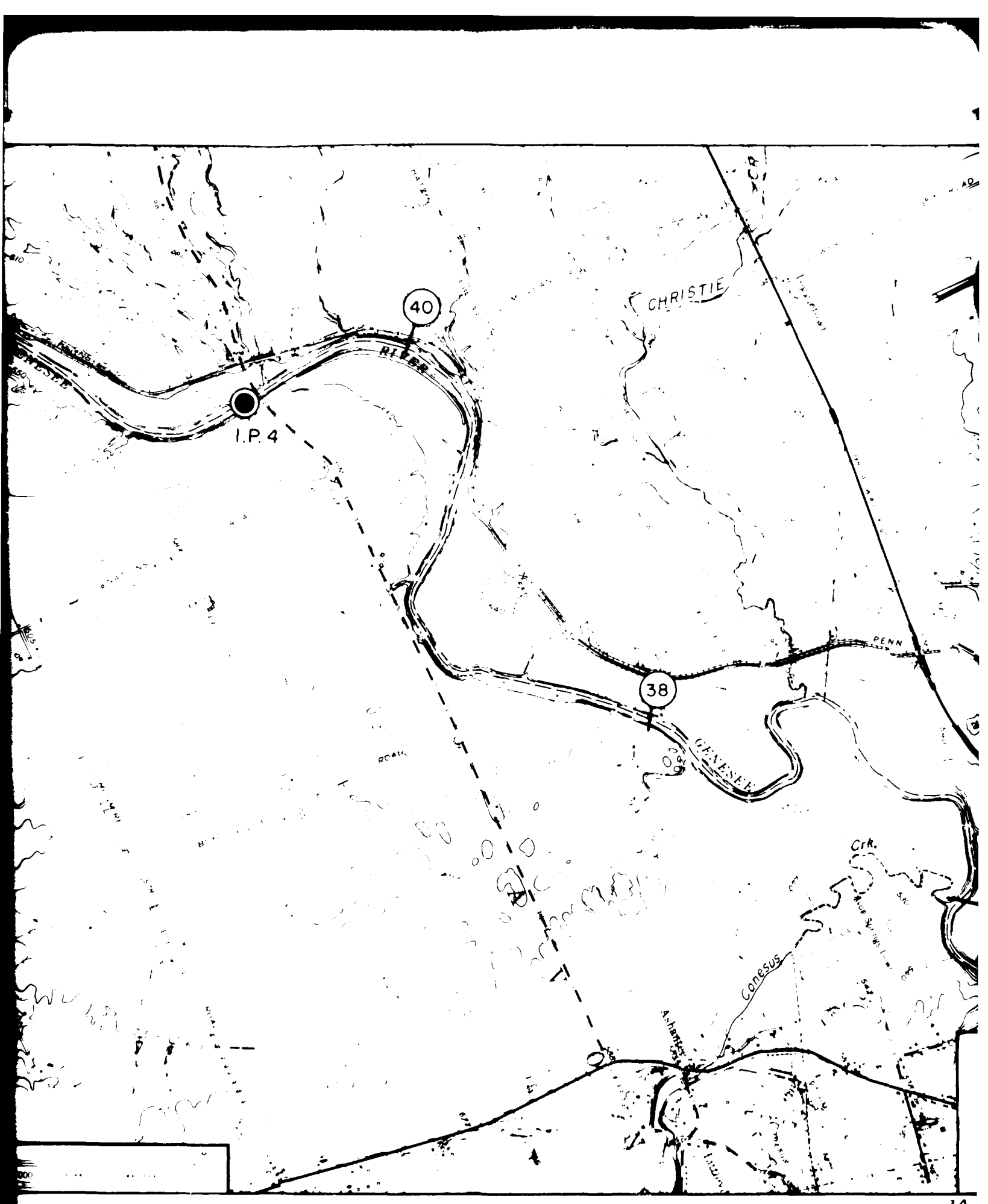
SUMMARY REPORT
ON WATER RESOURCES DEVELOPMENT
AVON
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO

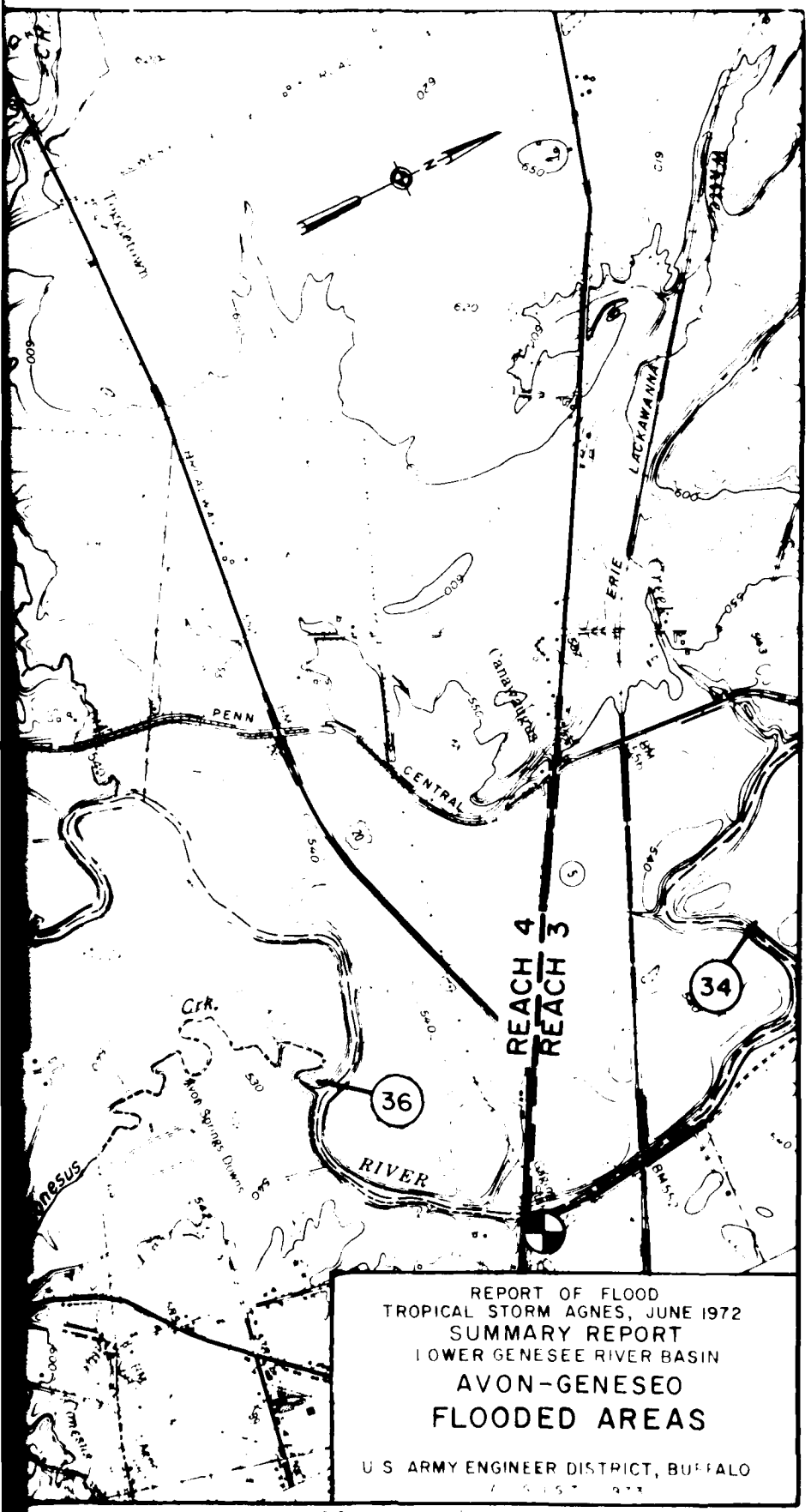
PLATE 7


Rippey's Corners
PENN CENTRAL
LUCIN PLA
54
48
50
52
ROAD
Hemp Pond
GENESEE RIVER
550
560
570
600
650
700



NOTES:
FOR LEGEND SEE PLATE 5

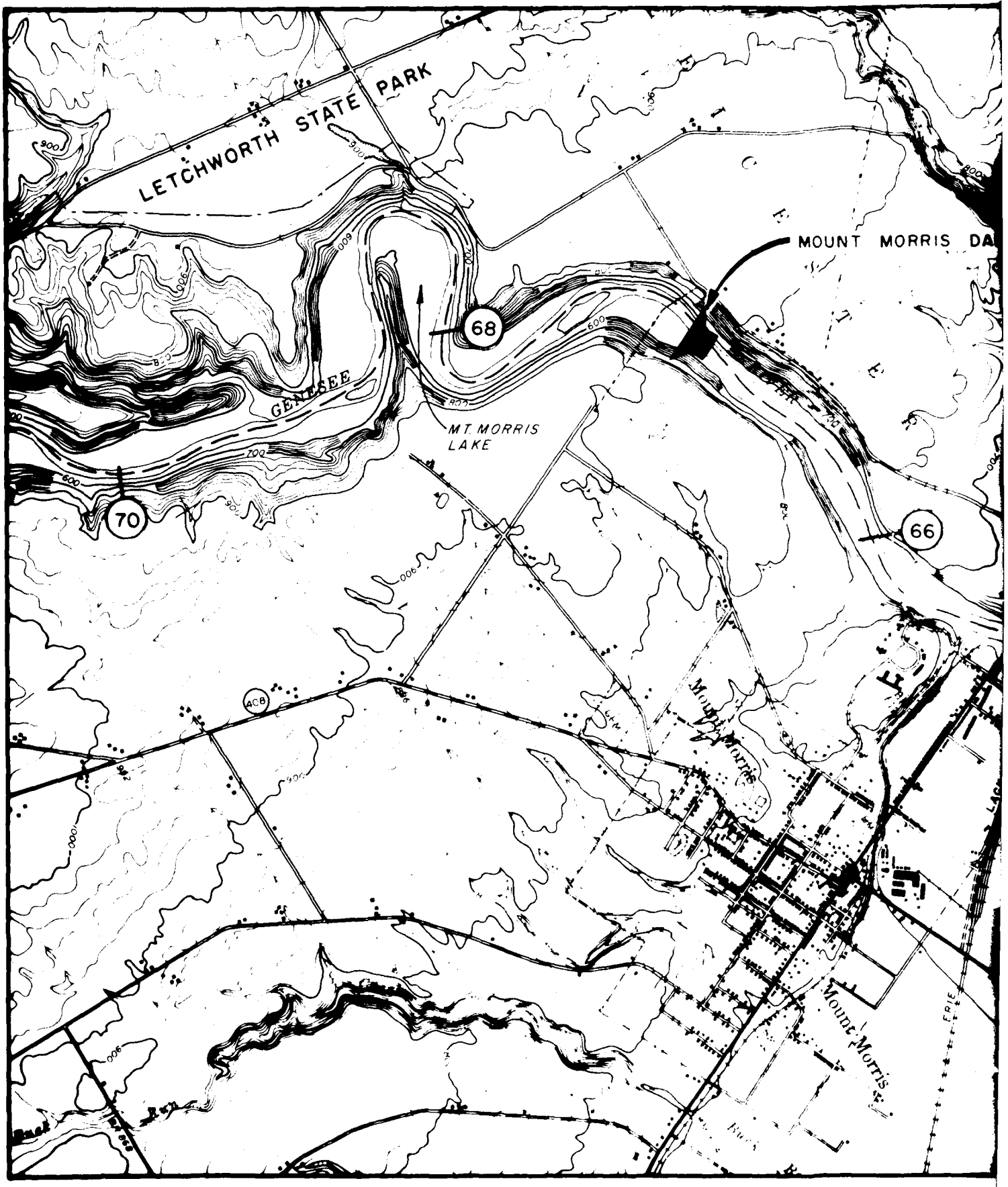

40
CHRISTIE
RIVER
I.P.4
38
PENN
GENESEE
Crk.
Conesus
Ashantee

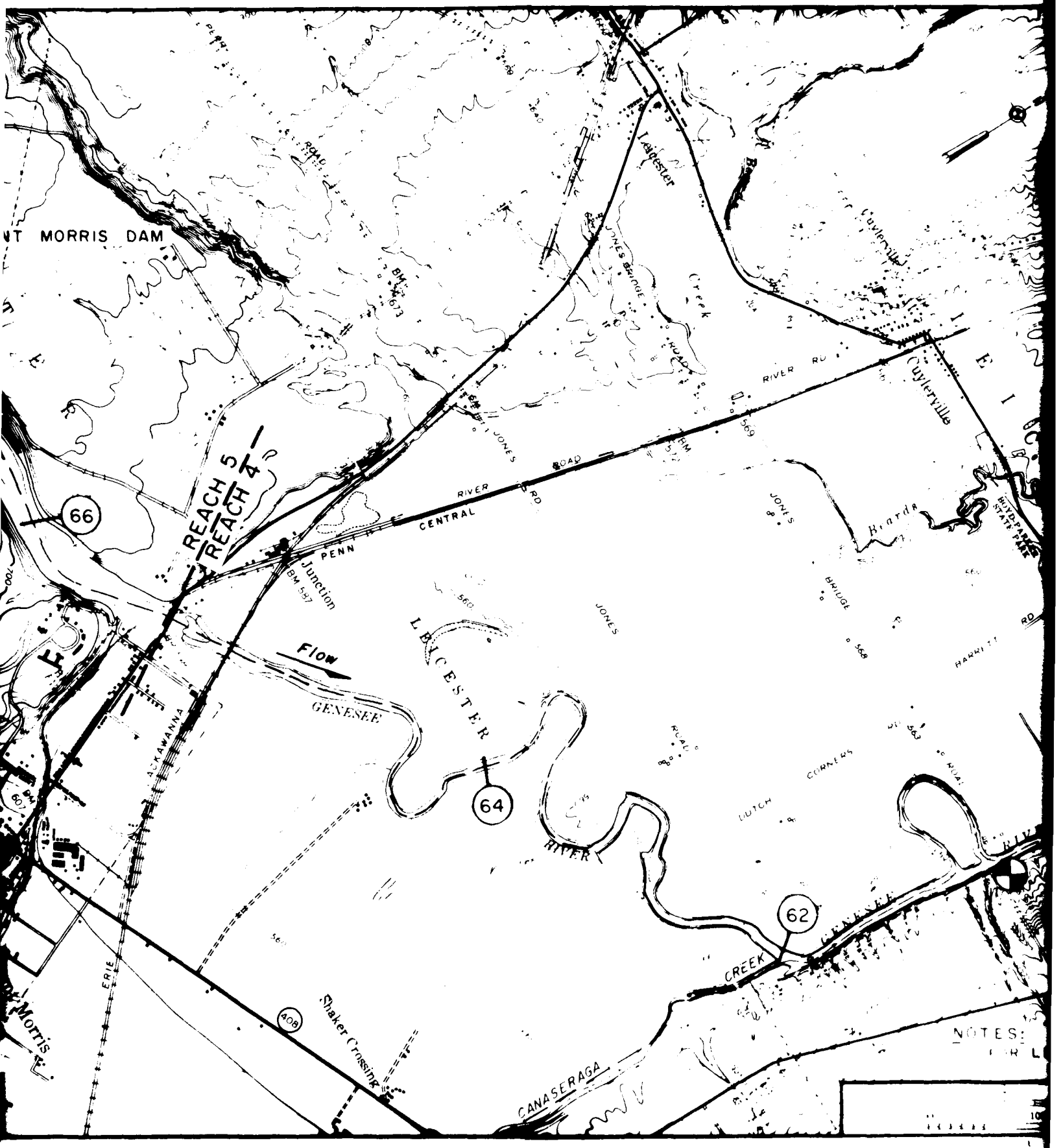


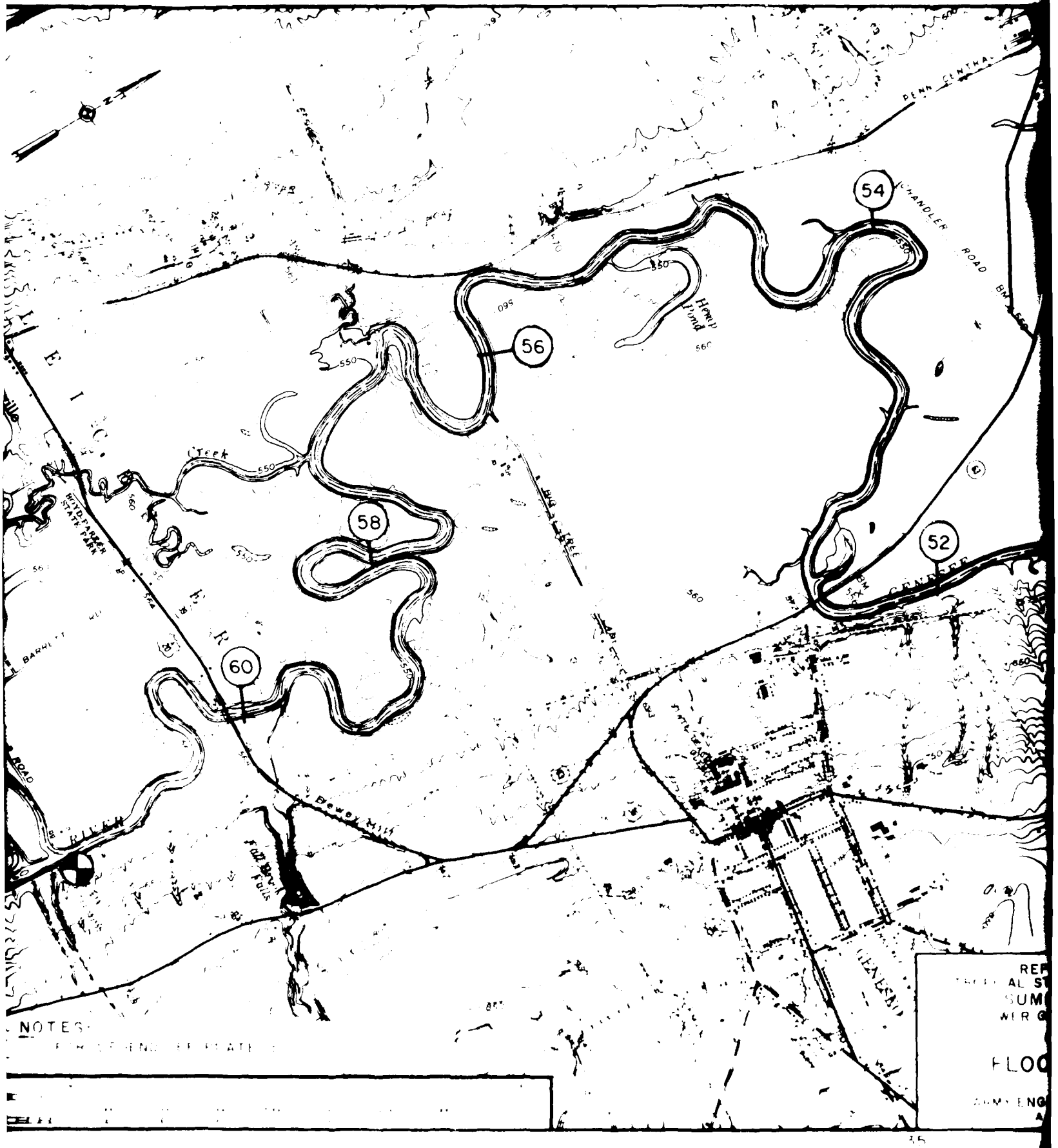
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN

AVON-GENESEO
FLOODED AREAS

U S ARMY ENGINEER DISTRICT, BUFFALO


LETCHWORTH STATE PARK
MOUNT MORRIS DA
68
GENESEE
MT. MORRIS
LAKE
70
66
ACB
Mount Morris
Mount Morris
ERIE


MORRIS DAM
REACH 5
REACH 4
66
64
62
Junction
PENN CENTRAL
RIVER RD
JONES ROAD
Jones Bridge
Creek
Leicester
Cuylerville
RIVER RU
Flow
GENESEE
LEICESTER
RIVER
CREEK
ERIE
LAKAWANNA
Morris
408
Shaker Crossing
CANASERAGA
Letchworth
Corners
Harriett
Rd
NOTES:


54
56
58
52
60
PENN CENTRAL
CHANDLER ROAD
HERRIT POND
Creek
WILDCAT PARKER STATE PARK
BARNETT
ROAD
RIVER
POND MILL
FOX POND
FALLS
CLEARLAND
NOTES

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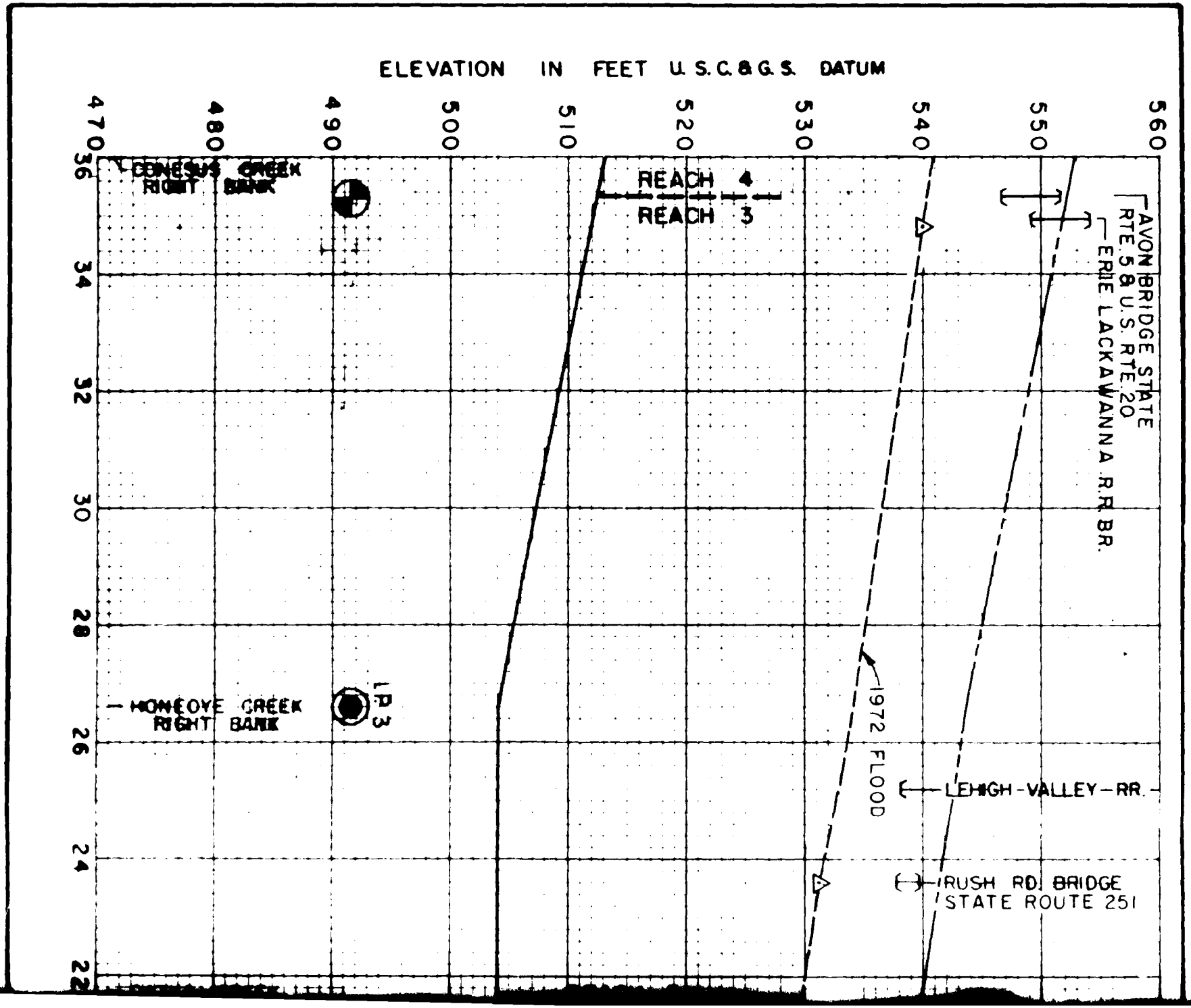
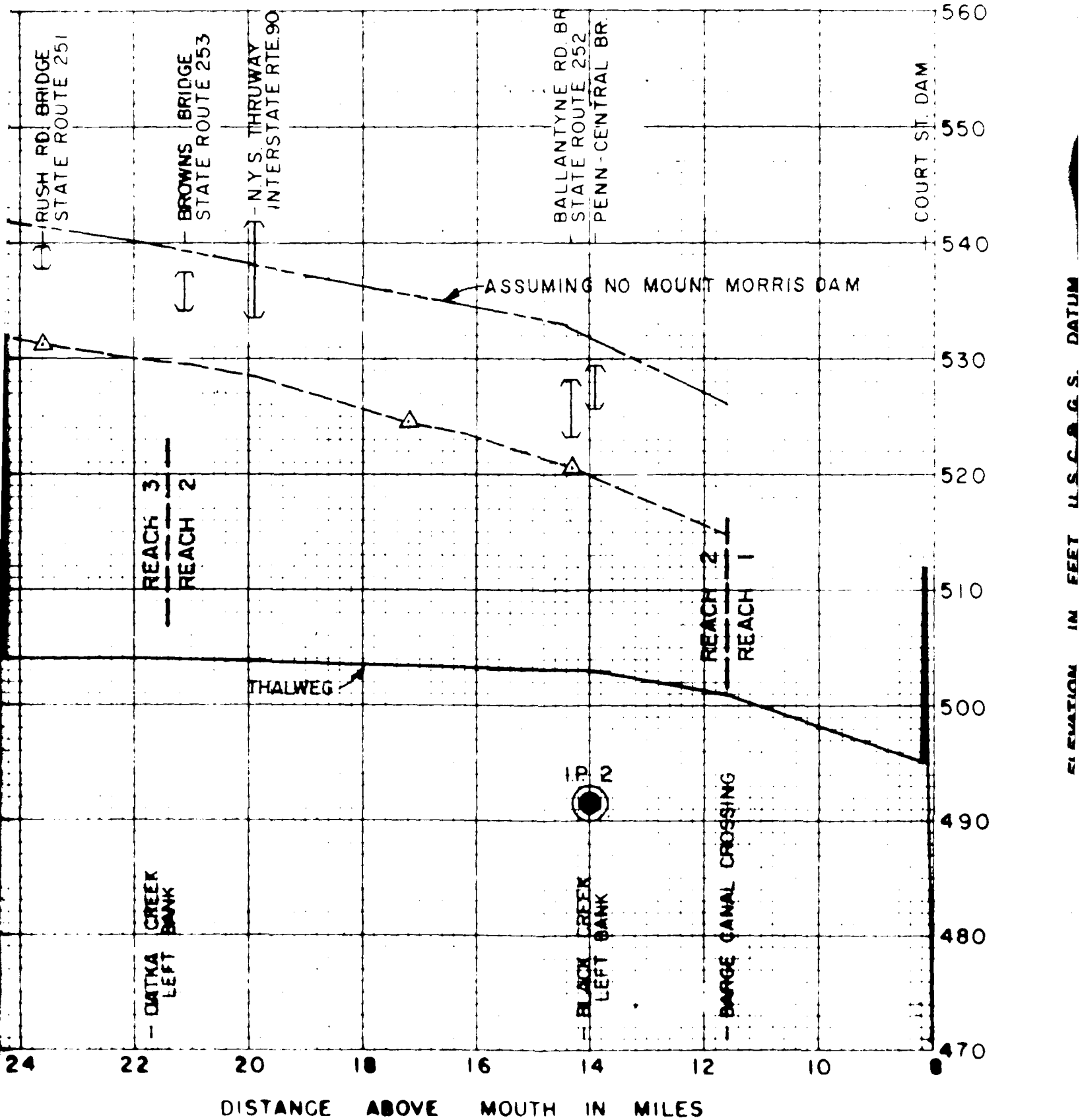
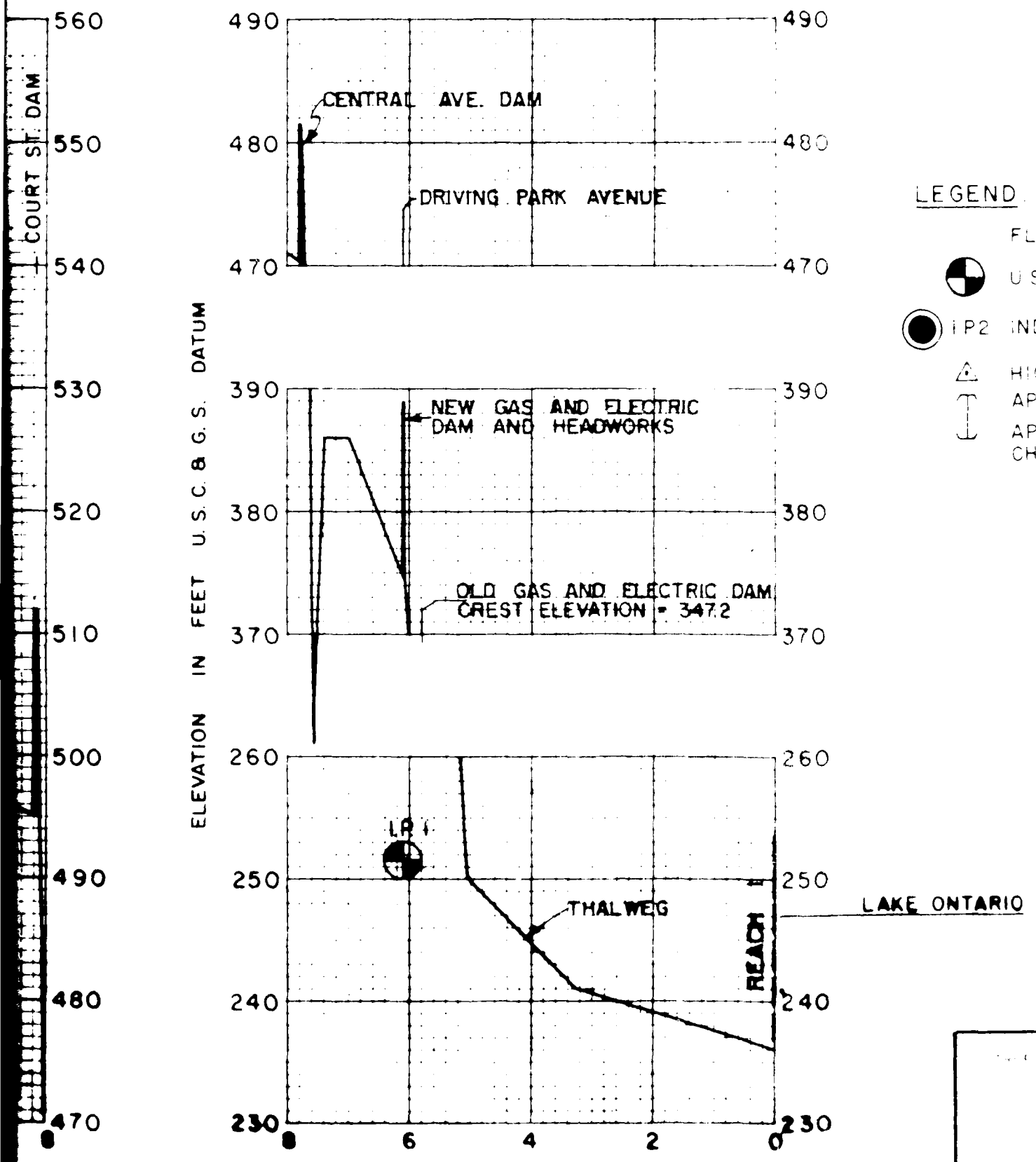
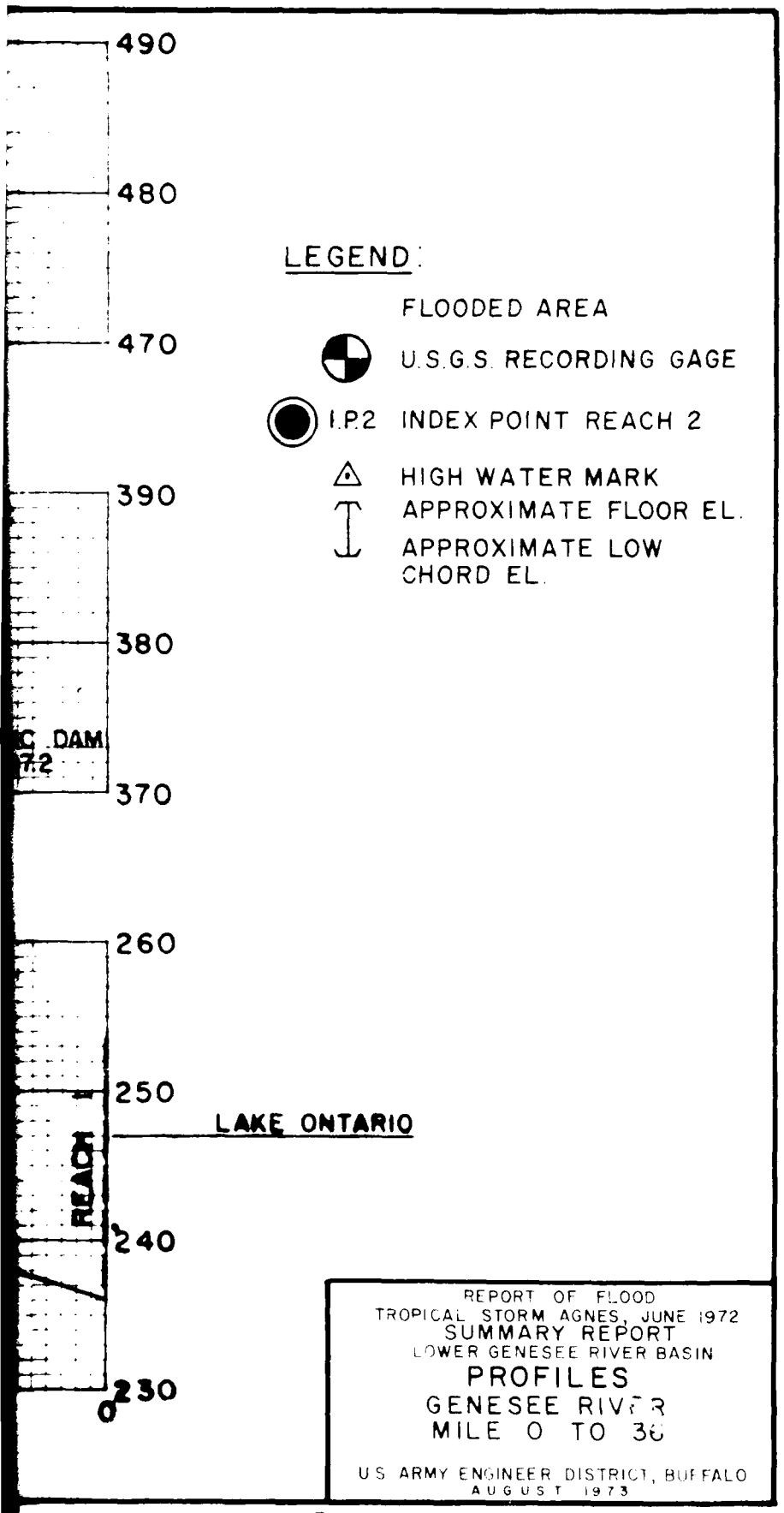
LOWER GENESEE RIVER BASIN
GENESEO
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO


ELEVATION IN FEET U.S.C.&G.S. DATUM
470
480
490
500
510
520
530
540
550
560
36
34
32
30
28
26
24
22
GENESUS CREEK
RIGHT BANK
REACH 4
REACH 3
AVON BRIDGE STATE
RTE. 5 & U.S. RTE. 20
ERIE LACKAWANNA R.R. BR.
HONEOYE CREEK
RIGHT BANK
L.P. 3
1972 FLOOD
LEHIGH-VALLEY-RR.
RUSH RD. BRIDGE
STATE ROUTE 251


RUSH RD. BRIDGE
STATE ROUTE 251
BROWNS BRIDGE
STATE ROUTE 253
N.Y.S. THRUWAY
INTERSTATE RTE. 90
BALLANTYNE RD. BR
STATE ROUTE 252
PENN-CENTRAL BR.
COURT ST. DAM
ASSUMING NO MOUNT MORRIS DAM
REACH 3
REACH 2
REACH 2
REACH 1
THALWEG
I.P. 2
CREEK BANK
LEFT BANK
BLACK CREEK
LEFT BANK
BARGE CANAL CROSSING
560
550
540
530
520
510
500
490
480
470
24
22
20
18
16
14
12
10
0
DISTANCE ABOVE MOUTH IN MILES
ELEVATION IN FEET U.S.C.&G.S. DATUM

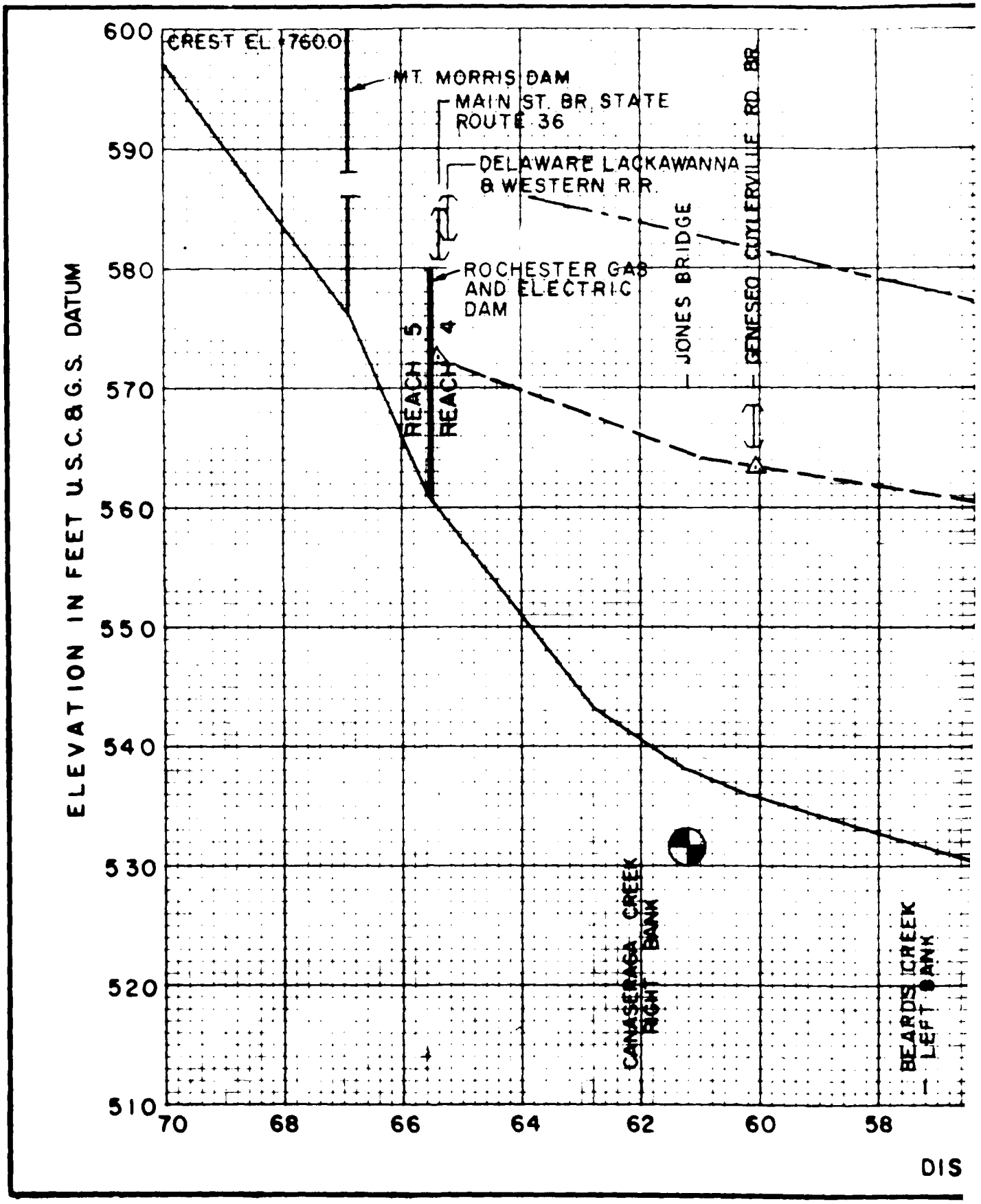

COURT ST. DAM
560
550
540
530
520
510
500
490
480
470
490
480
470
CENTRAL AVE. DAM
DRIVING PARK AVENUE
390
380
370
NEW GAS AND ELECTRIC DAM AND HEADWORKS
OLD GAS AND ELECTRIC DAM CREST ELEVATION = 347.2
260
250
240
230
LP1
THALWEG
REACH
LAKE ONTARIO
8
6
4
2
0
ELEVATION IN FEET U.S.C.&G.S. DATUM
LEGEND
FLOODED A
U S G S REC
IP2 INDEX POIN
HIGH WATE
APPROXIMA
APPROXIMA
CHORD EL.

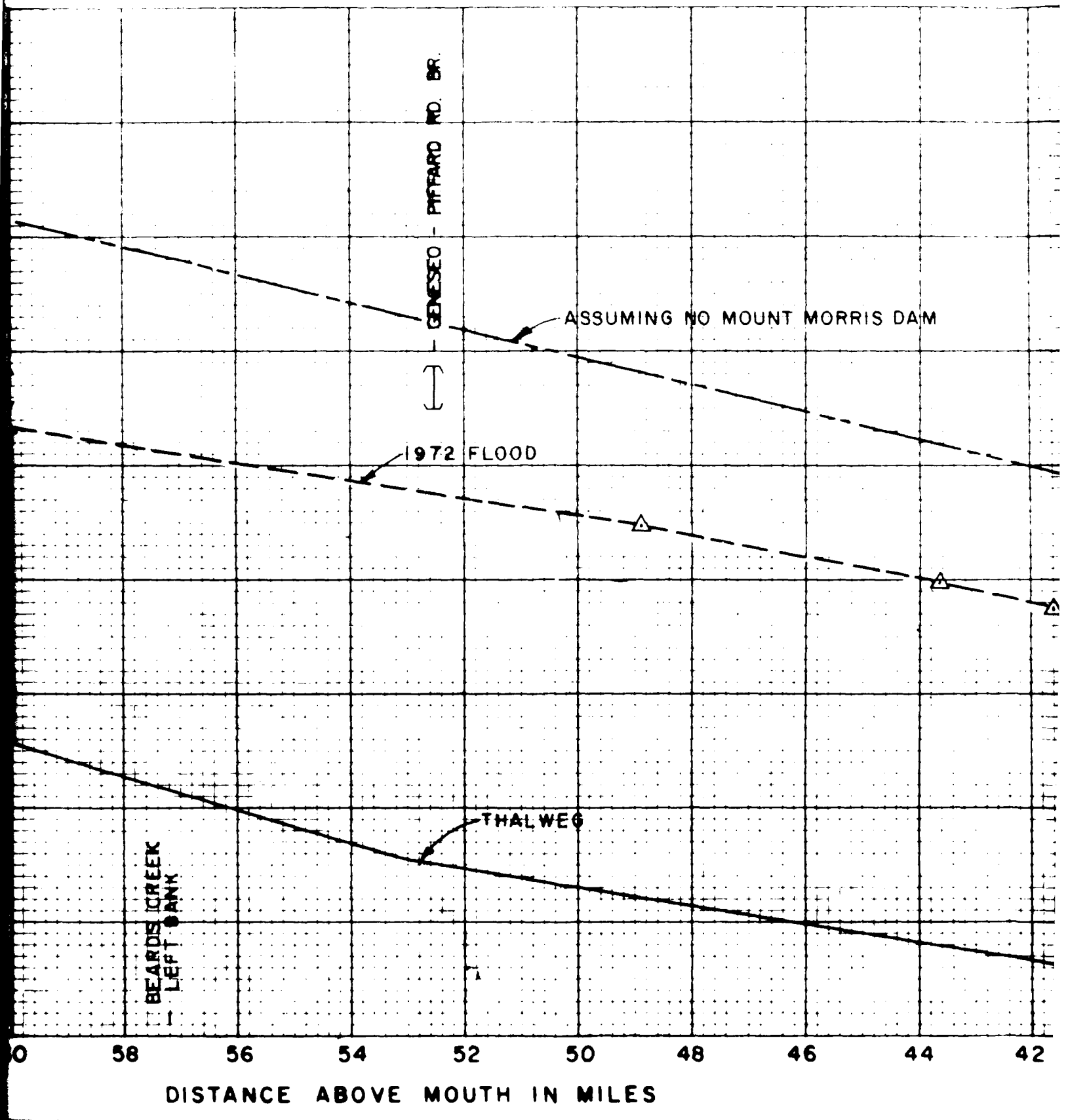


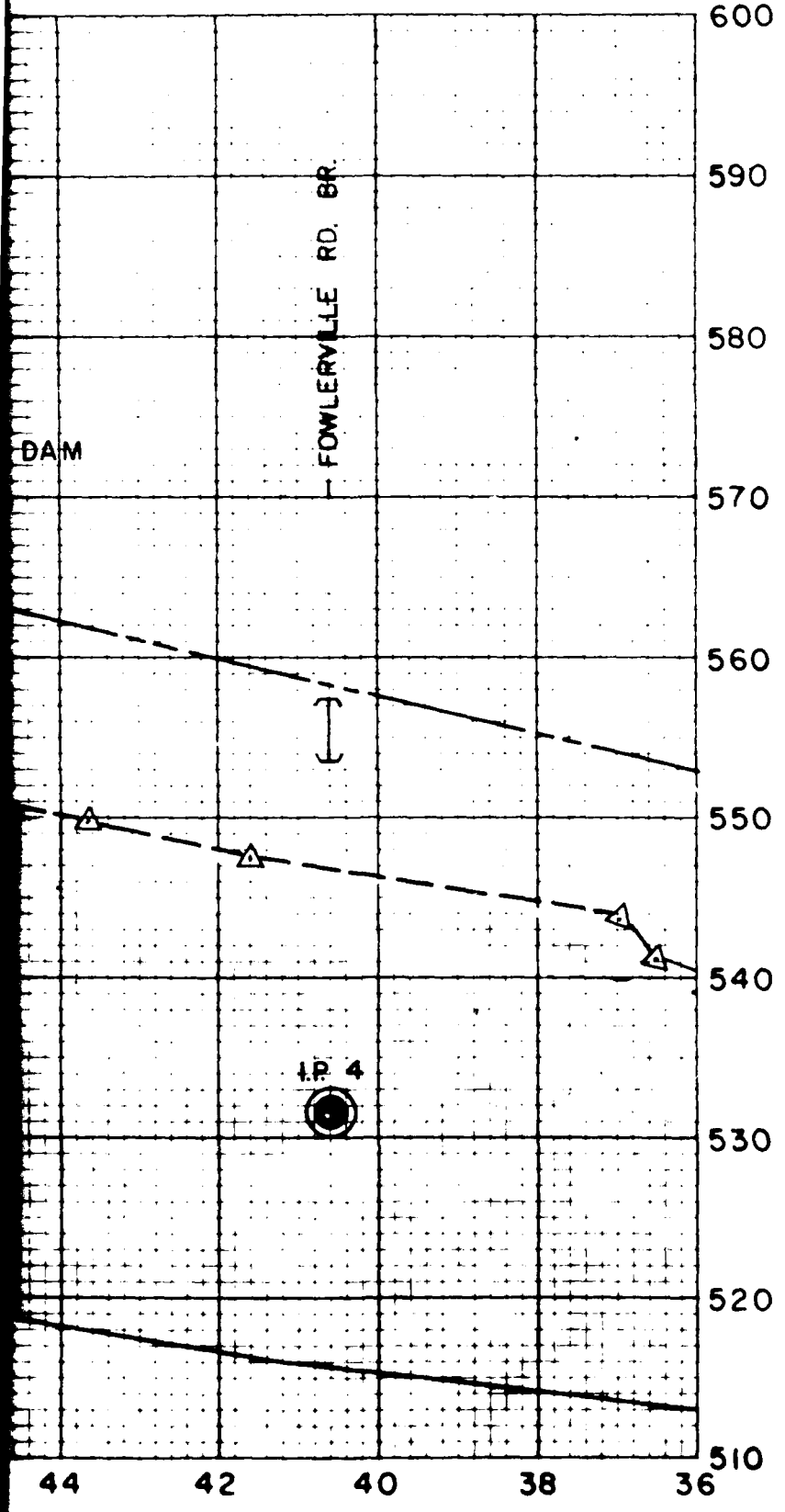
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN

PROFILES
GENESEE RIVER
MILE 0 TO 36

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973


CREST EL. 1760.0
MT. MORRIS DAM
MAIN ST. BR. STATE ROUTE 36
DELAWARE LACKAWANNA & WESTERN R.R.
ROCHESTER GAS AND ELECTRIC DAM
REACH 5
REACH 4
JONES BRIDGE
GENESEO CUTLERVILLE RD. BR.
CANASERAGA CREEK RIGHT BANK
BEARDS CREEK LEFT BANK
ELEVATION IN FEET U.S.C.&G.S. DATUM
600
590
580
570
560
550
540
530
520
510
70
68
66
64
62
60
58
DIS


GENESEO - PIFFARD RD. BR.
ASSUMING NO MOUNT MORRIS DAM
1972 FLOOD
THALWEG
BEARDS CREEK
LEFT BANK
0
58
56
54
52
50
48
46
44
42
DISTANCE ABOVE MOUTH IN MILES



NOTE:
FOR LEGEND SEE PLATE 10

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN
PROFILES
GENESEE RIVER
MILE 36 TO 70

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 11

THE UPPER GENESEE RIVER BASIN

The upper Genesee River is that portion that extends from Mount Morris Lake, upstream to northern Pennyslvania, a distance of approximately 90 miles. The major communities along it are Portageville, Fillmore, Houghton, Caneadea, Belfast, Belvidere, Belmont, Scio, Wellsville, Stannards Corners, Shongo and Genesee, PA. Wellsville is described in detail in a subsequent section of this report and is only generally mentioned in this section.

Before the flood, there were two water stage recorders operated by the U.S. Geological Survey on the upper Genesee River. One at Portageville and another at Scio. Both stations were destroyed during the flood and have been replaced at new locations. Table 9 gives pertinent discharge data at the water stage recording sites and index points as located on the flooded area maps.

Table 9. Pertinent Discharge Data on the Upper Genesee River for the June 1972 Flood

Site	Drainage Area (sq. miles)	Period of Record	Gage Height (feet)	Estimated Instantaneous Peak Flow (cfs)	Approximate Frequency (years)
Portageville gage	982	1908-72	(1)	83,900 (2) 90,000 (3)	285
Fillmore	726			67,700	240
Belfast	641			62,300	200
Belvidere	483			52,300	190
Belmont	418			48,200	150
Scio gage	309	1916-72	(1)	41,300 (2)	130
Wellsville (4)	288			38,500	125
Stannards Corners	212			24,500 (2)	55
Shongo	179			20,200 (2)	35

(1) Gage destroyed during June 1972 flood.
(2) Corps of Engineers estimate
(3) U.S.G.S. estimate
(4) Described in detail in the Wellsville section of this report.

Based on precipitation gages and on a bucket survey made shortly after the flood in the upper Genesee River Basin, it is estimated that an average of 10.2 inches of rain fell from 20 to 25 June. Of this total, approximately 9.7 inches fell from 9 p.m. on 20 June to 6 a.m. on 23 June. The intensity of the rainfall was markedly greater than in the lower Genesee River Basin.

The June 1972 floods associated with Tropical Storm "Agnes" had two peaks on the upper Genesee River, each a flood of record, caused by two very intense periods of rainfall. The first peak occurred on the morning of 21 June and was the flood of record. It remained the flood of record until two days later, June 23, when it was exceeded by approximately 1 foot. On 22 June, the day between the two record floods, the water had subsided and was actually below flood stage at certain reaches.

One life was lost as a direct result of the flood. This occurred at Scio on 22 June where Vandermark Creek normally flows under Route 19. The south approach to the bridge had been washed out and the road was barricaded. The man apparently thought the road was intact, drove around the barricade and into the washed out section of road, and drowned.

Total estimated June 1972 flood damages are given by reaches in Table 10. Reach limits are shown on flooded area maps.

Figures 6 through 13 show flood conditions and results of the June Flood.

The area inundated by the June 1972 flood is shown on Plates 12 through 16. Profiles of the flood are shown on Plates 17 and 18.

Table 10. - Total Estimated Damages on the Upper Genesee River

Reach	Total Estimated June 1972 Flood Damage				
	Residential	Commercial	Public and Other	Agricultural	Reach Total
	$	$	$ (1)	$	$
Mt. Morris Lake			1,476,000		1,476,000 (1)
Portageville gage	187,000	178,000	1,201,000	197,000	1,763,000
Fillmore	301,000	17,000	1,137,000	443,000	1,898,000
Belfast	25,000	94,000	1,627,000	165,000	1,911,000
Belvidere	(2)	(2)	101,000	60,000	161,000
Belmont	177,000	169,000	1,305,000	48,000	1,699,000
Scio gage	602,000	77,000	456,000	50,000	1,185,000
Wellsville (3)	492,000	1,499,000	5,660,000	5,000	7,656,000
Stannards Corners	8,000	(2)	44,000	9,000	61,000
Shongo	47,000	(2)	113,000	29,000	189,000
TOTAL	1,839,000	2,034,000	13,120,000	1,006,000	17,999,000

(1) Damage is due to deposition of debris and sediment.
(2) Assumed negligible or non-existent.
(3) All in Wellsville and includes those damages up to the Miller Street Bridge on Dyke Creek.

Figure 6 Looking north at State Route 245 bridge in Portageville at River mile 87. Photo taken 23 June 1972.

Figure 7. Residence in Portageville at River mile 87.5. Photo taken 23 June 1972.

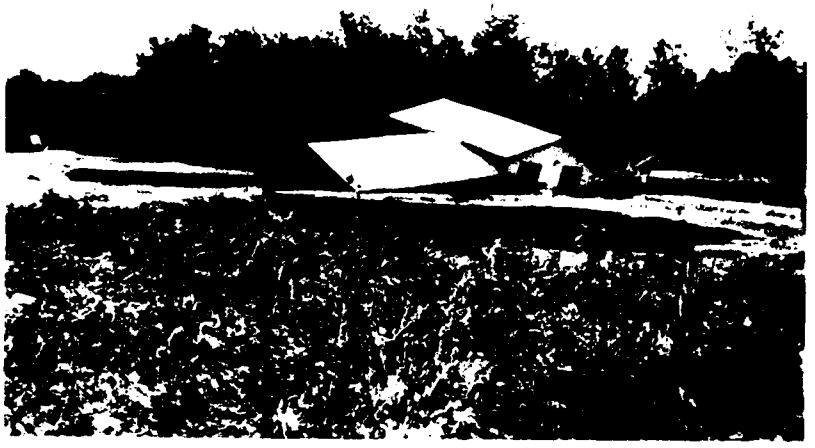
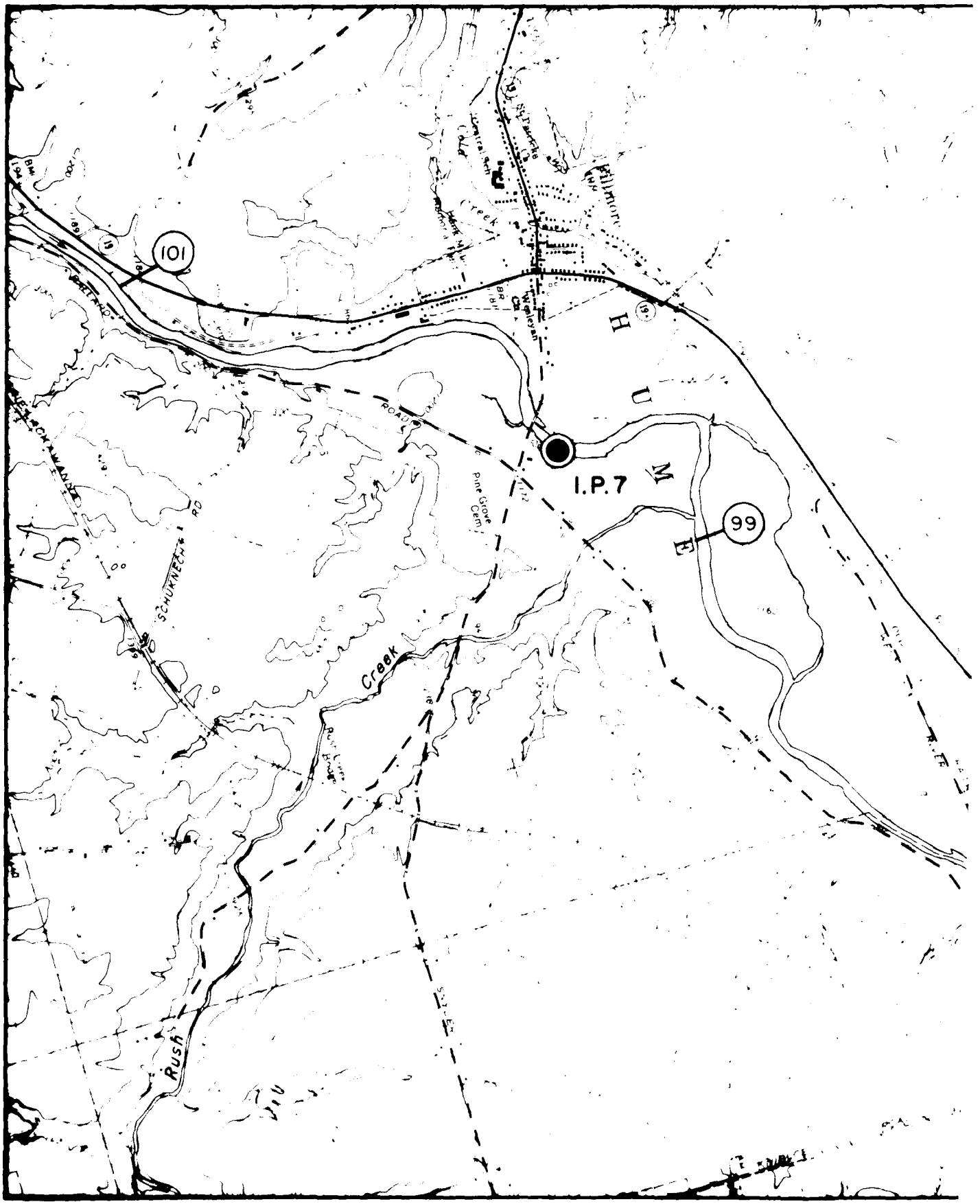


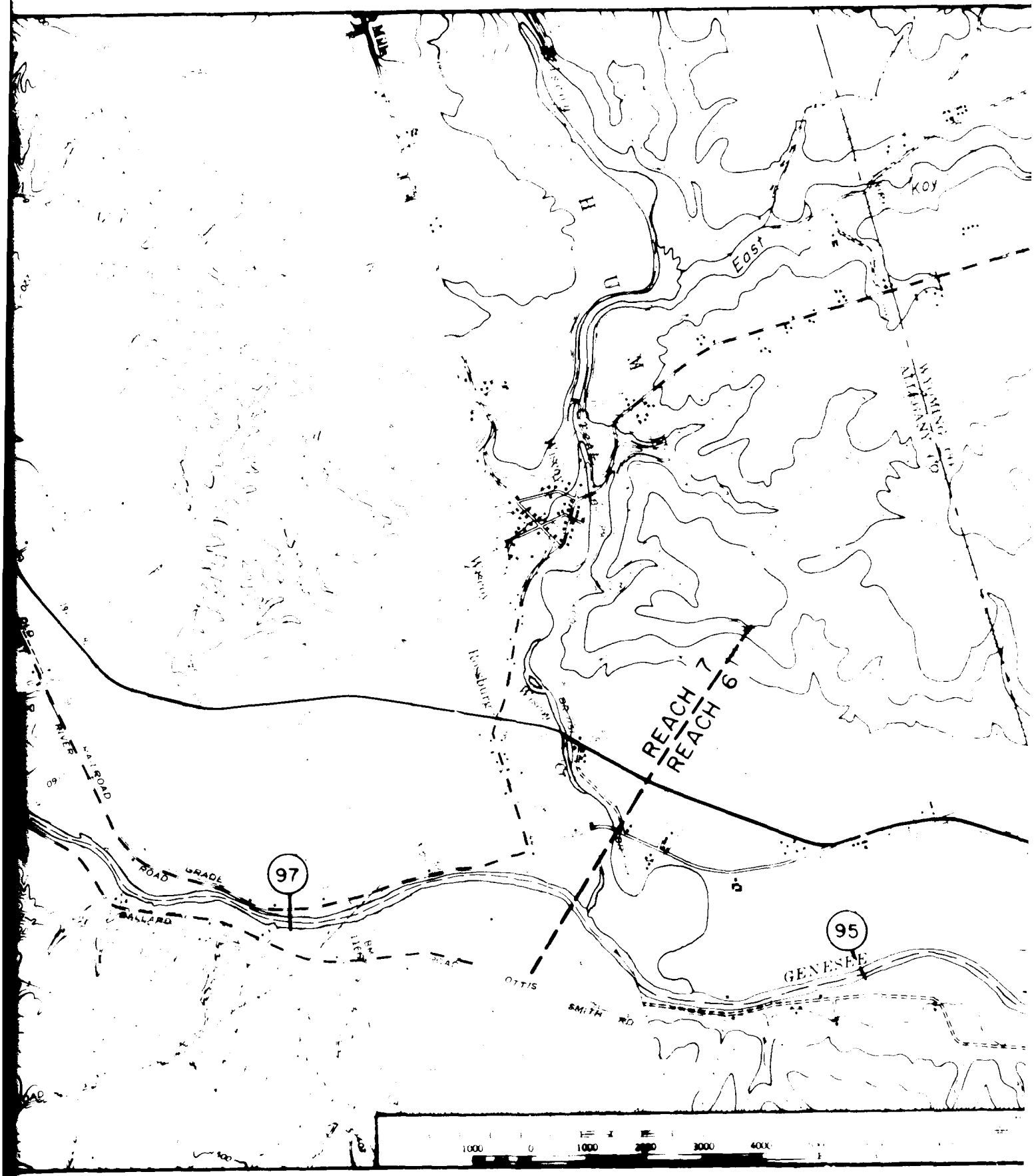
Figure 8 Looking downstream from Snyder Hill Road at River mile 99.7 at house damaged by the flood. Photo taken in 29 June 1972.

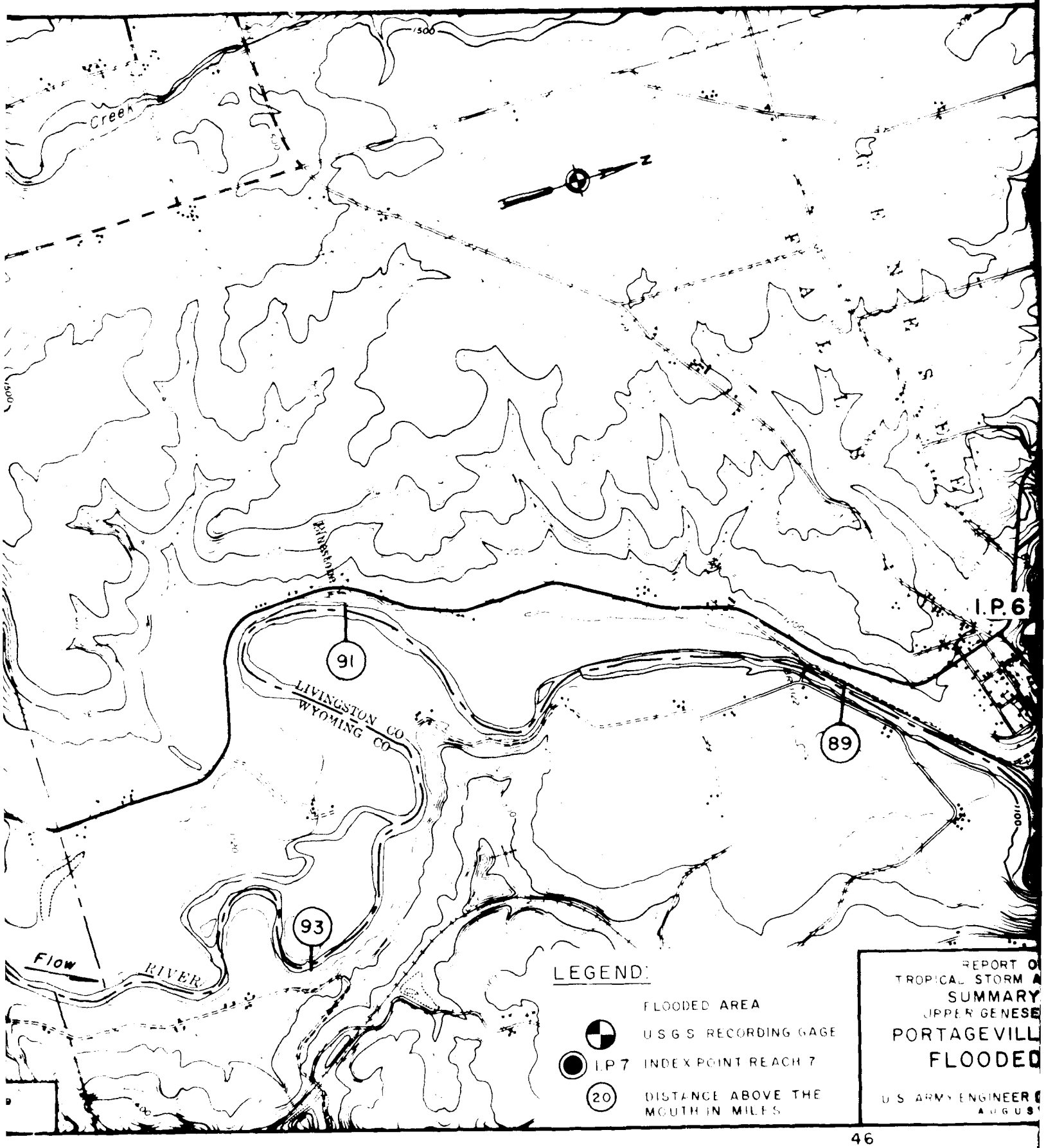
Figure 9 Looking upstream at damage to West River Road at River mile 97. Photo taken 29 June 1972.

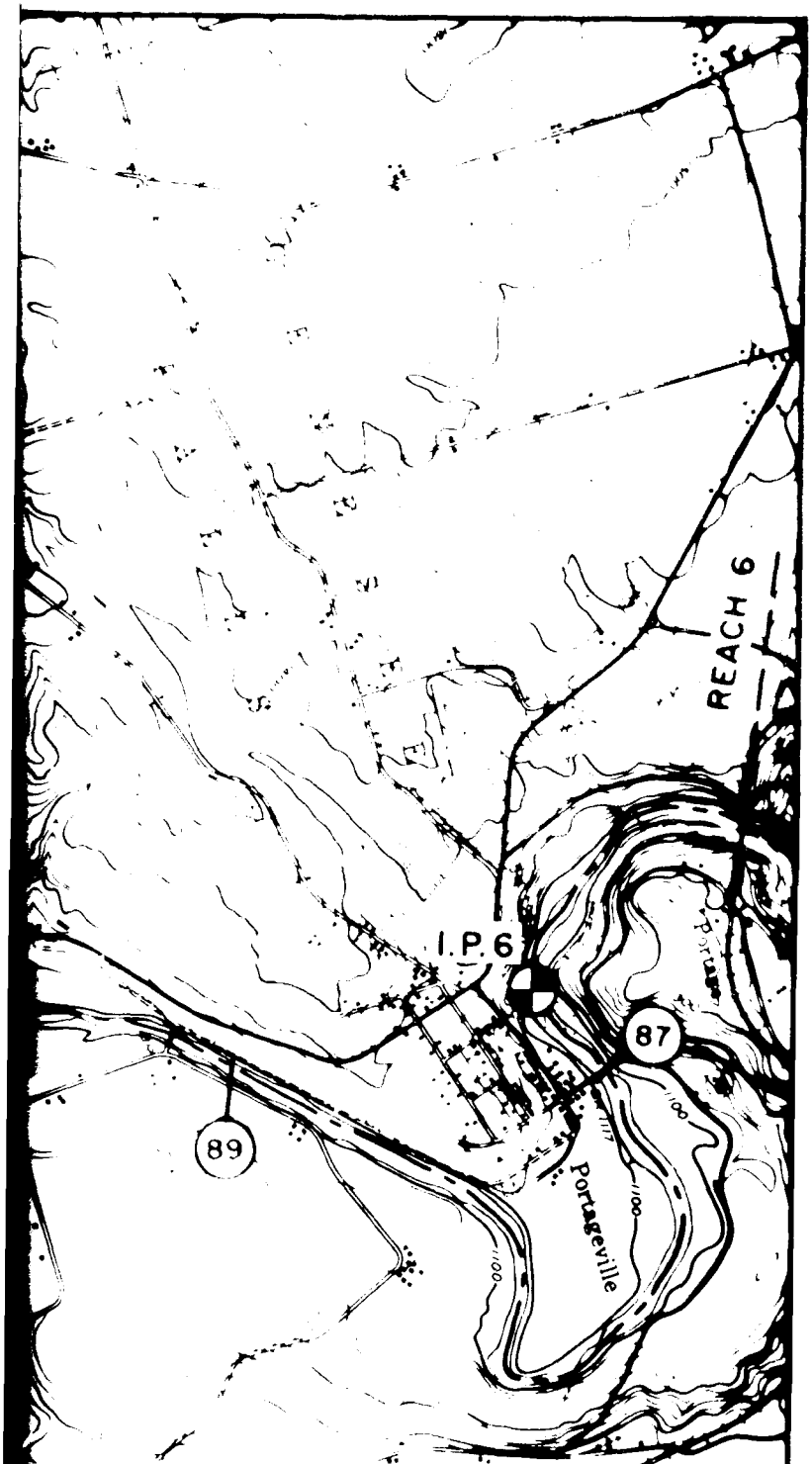
Figure 10 Looking south along Lattice Road at River mile 107.1. Photo taken 29 June 1972.

Figure 11 Looking at River Hill Road Bridge from the left bank at River mile 113.5. Photo taken in July 1972.


101
I.P.7
99
Pine Grove Cem.
SCHUKNECHT RD
Creek
RUSH


East
REACH 7
REACH 6
97
95
GENESEE
OTTIS
SMITH RD
BALLARD
ROAD
GRADE
RIVER
RAILROAD
1000
0
1000
2000
3000
4000

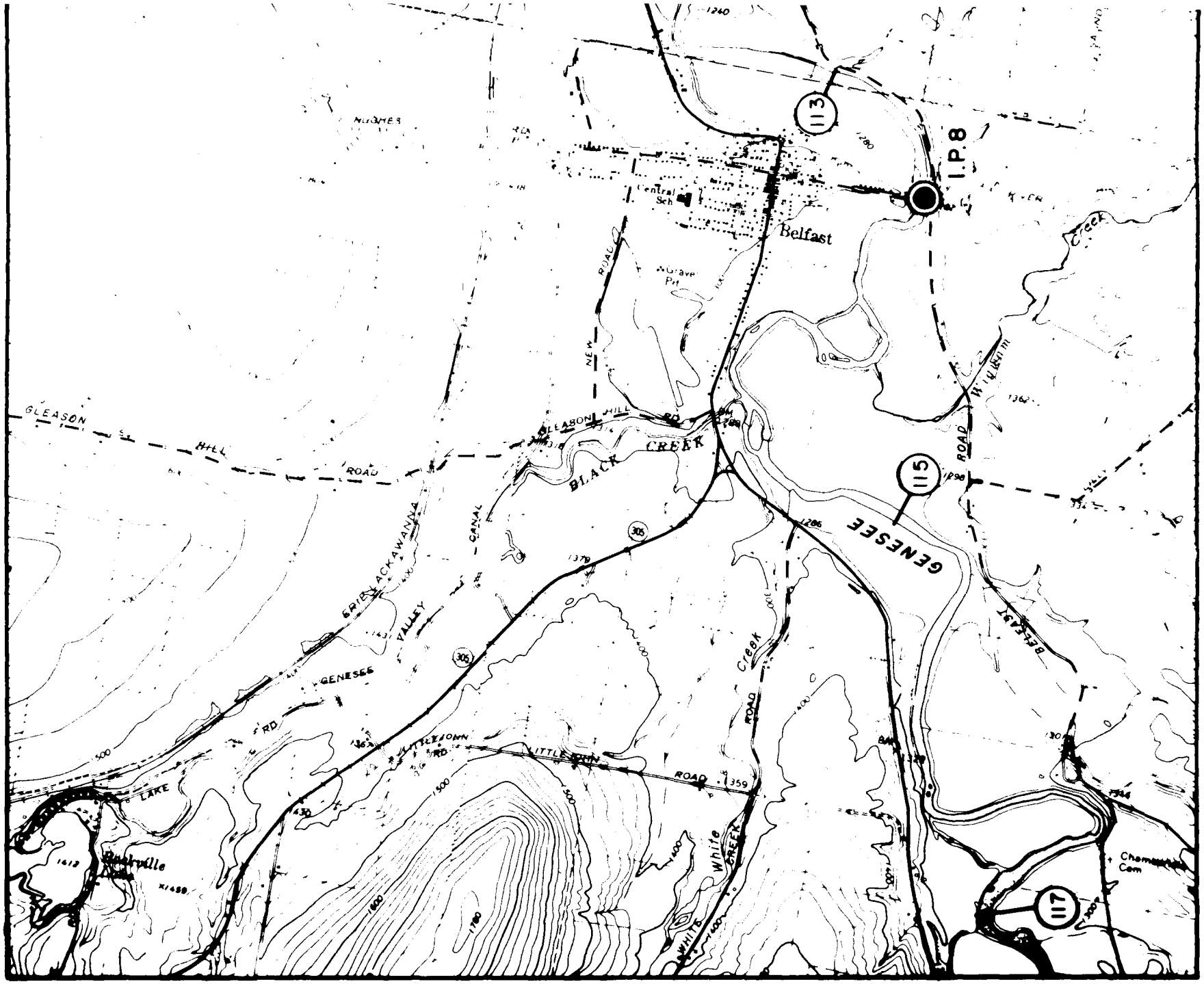

Creek
1500
N
Bigelow Br
I.P.6
91
89
93
LIVINGSTON CO
WYOMING CO
Flow
RIVER
1100
LEGEND:
FLOODED AREA
U S G S RECORDING GAGE
I.P.7 INDEX POINT REACH 7
20 DISTANCE ABOVE THE MOUTH IN MILES
REPORT O
TROPICAL STORM A
SUMMARY
UPPER GENESE
PORTAGEVILL
FLOODED
U S ARMY ENGINEER
AUGUS



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
PORTAGEVILLE - FILLMORE
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
BUFFALO, NEW YORK

AREA
RDON
INT
ABOVE THE
MILE


I.P.8
Belfast
Central Sch
Cemetery
NEW
ROAD
HUGHES
RD
GLEASON HILL ROAD
BLACK CREEK
GENESEE
ROAD
CANAL
BUFFALO
GENESEE
VALLEY
LITTLEJOHN
ROAD
LAKE
White
Creek
Chamberlain
Cem
113
115
117
305
1240
1280
1300
1320
1340
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1400
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1440
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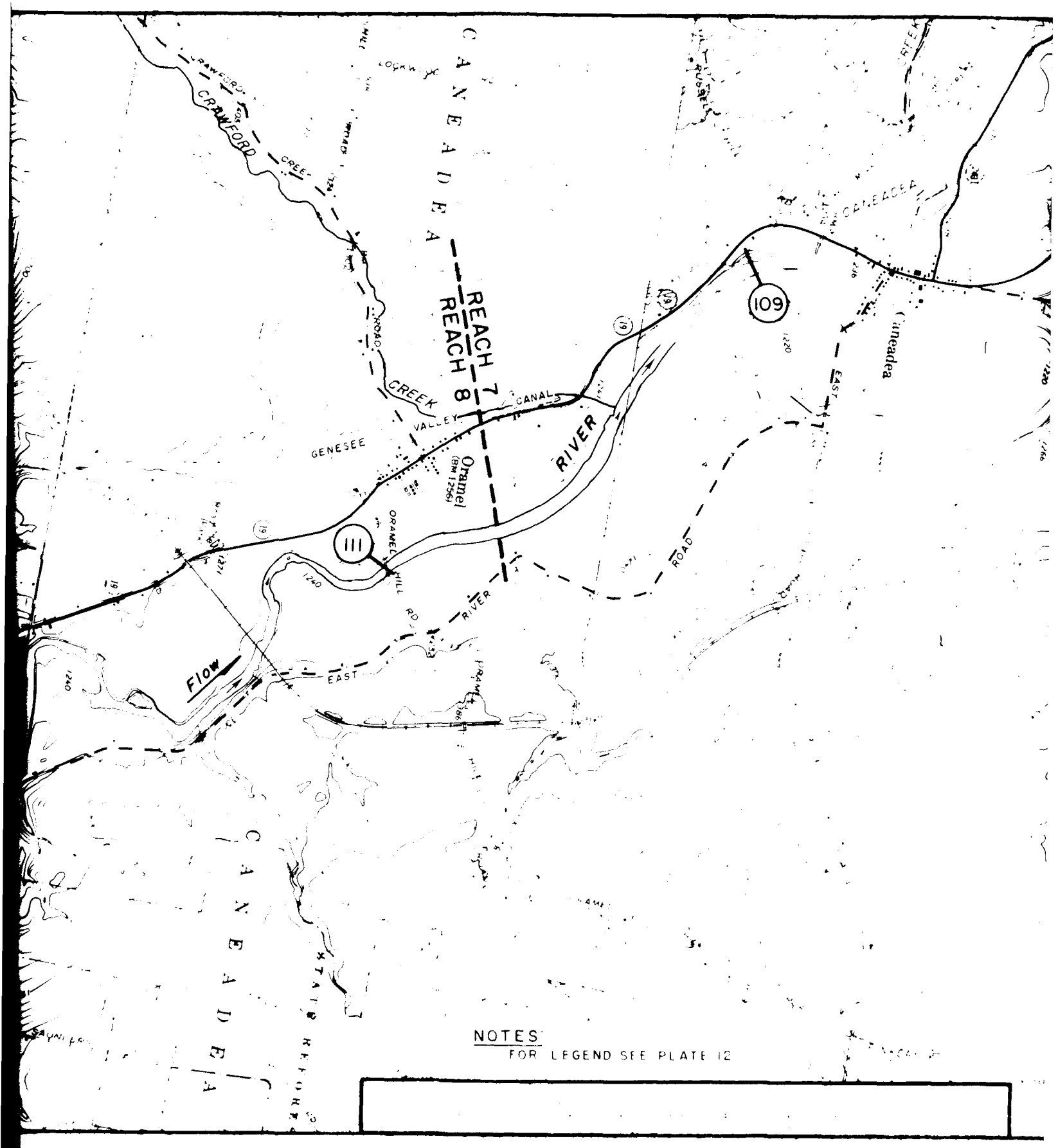
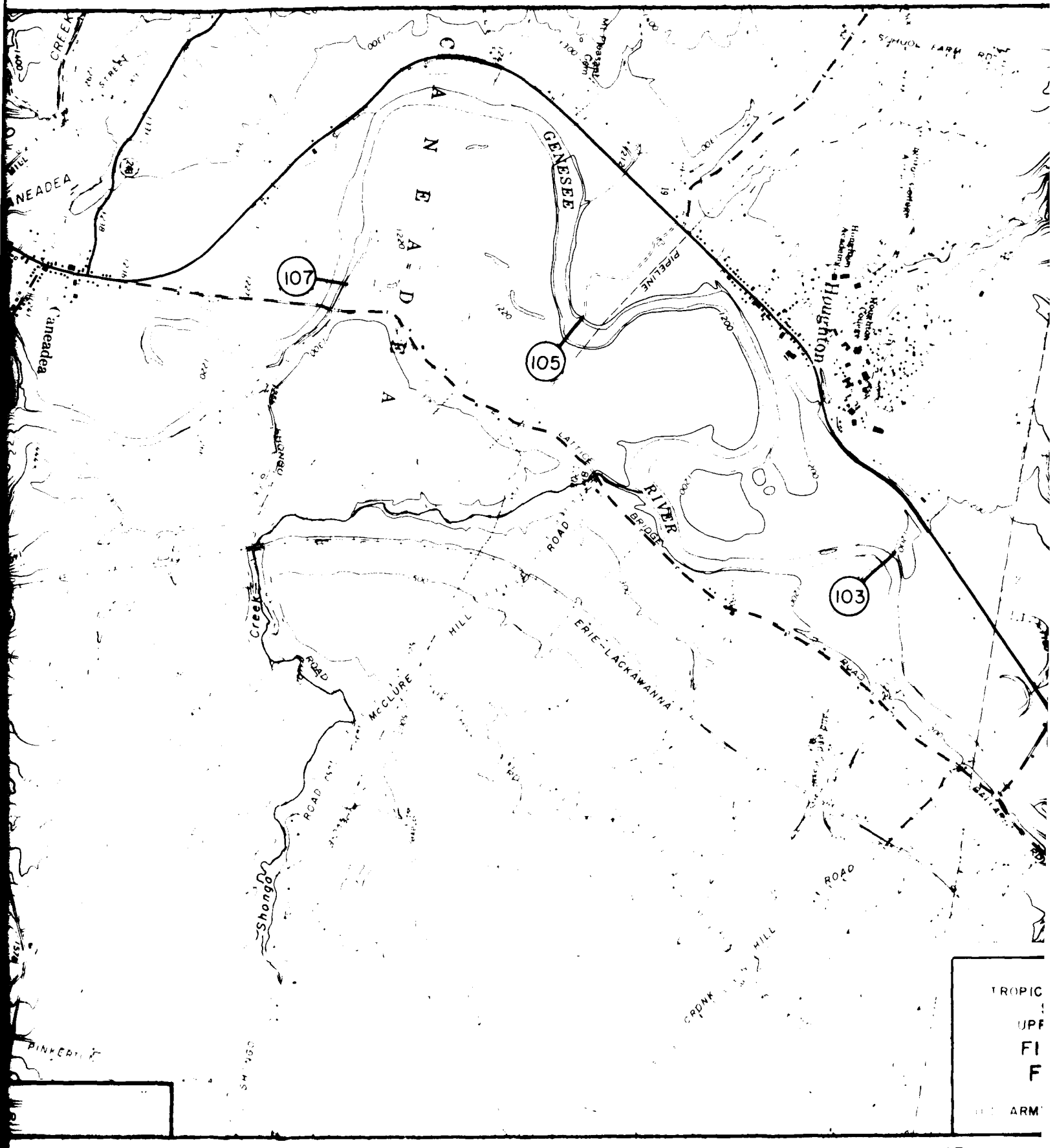
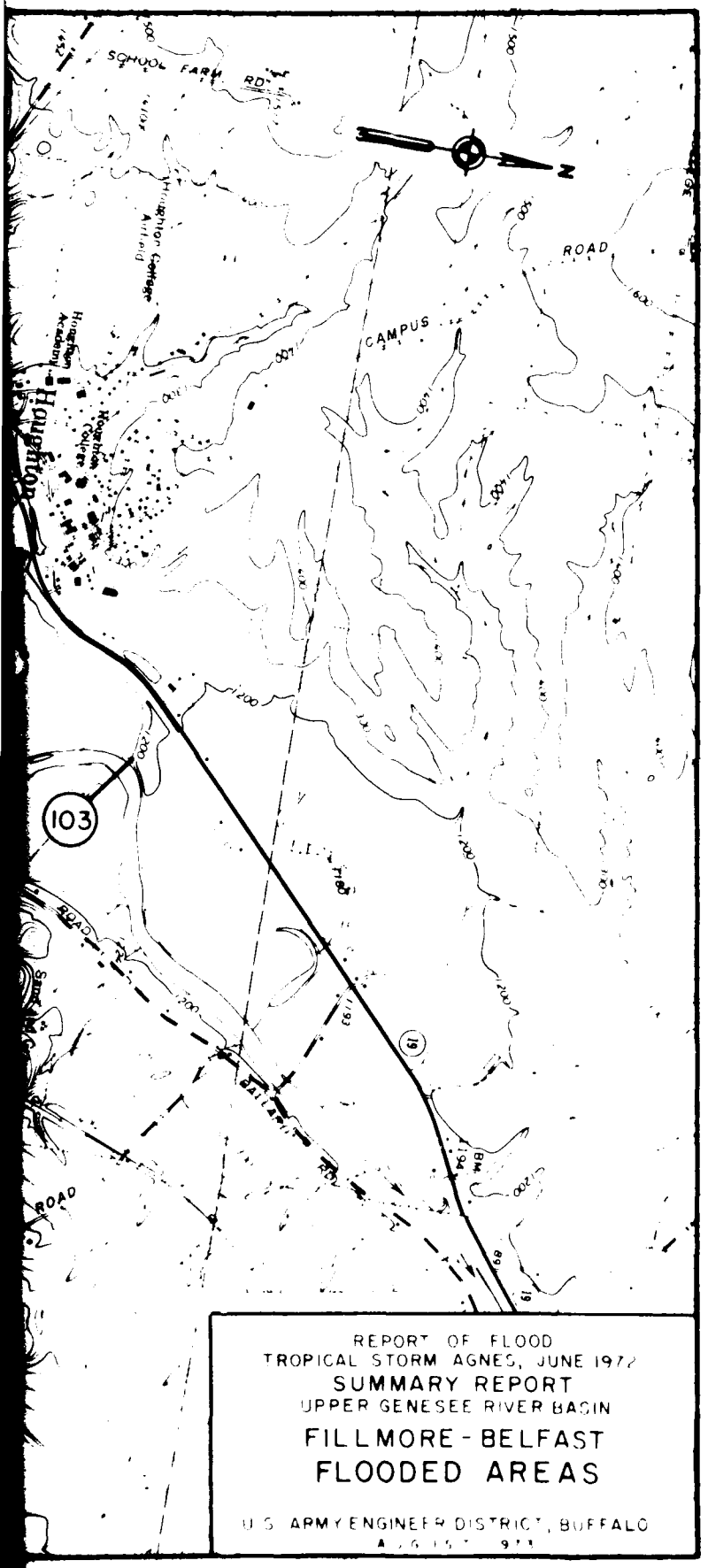
1480
1500
1520
1540
1560
1580
1600
1620



NOTES

FOR LEGEND SEE PLATE 12


CANEADEA
GENESEE
PIPELINE
107
105
103
Houghton
RIVER
BRIDGE
ROAD
HILL
McCLURE
ERIE-LACKAWANNA
Shongo
Creek
Caneadea
PINKERTON
CRONK
TROPIC
UPP
FI
F
ARM

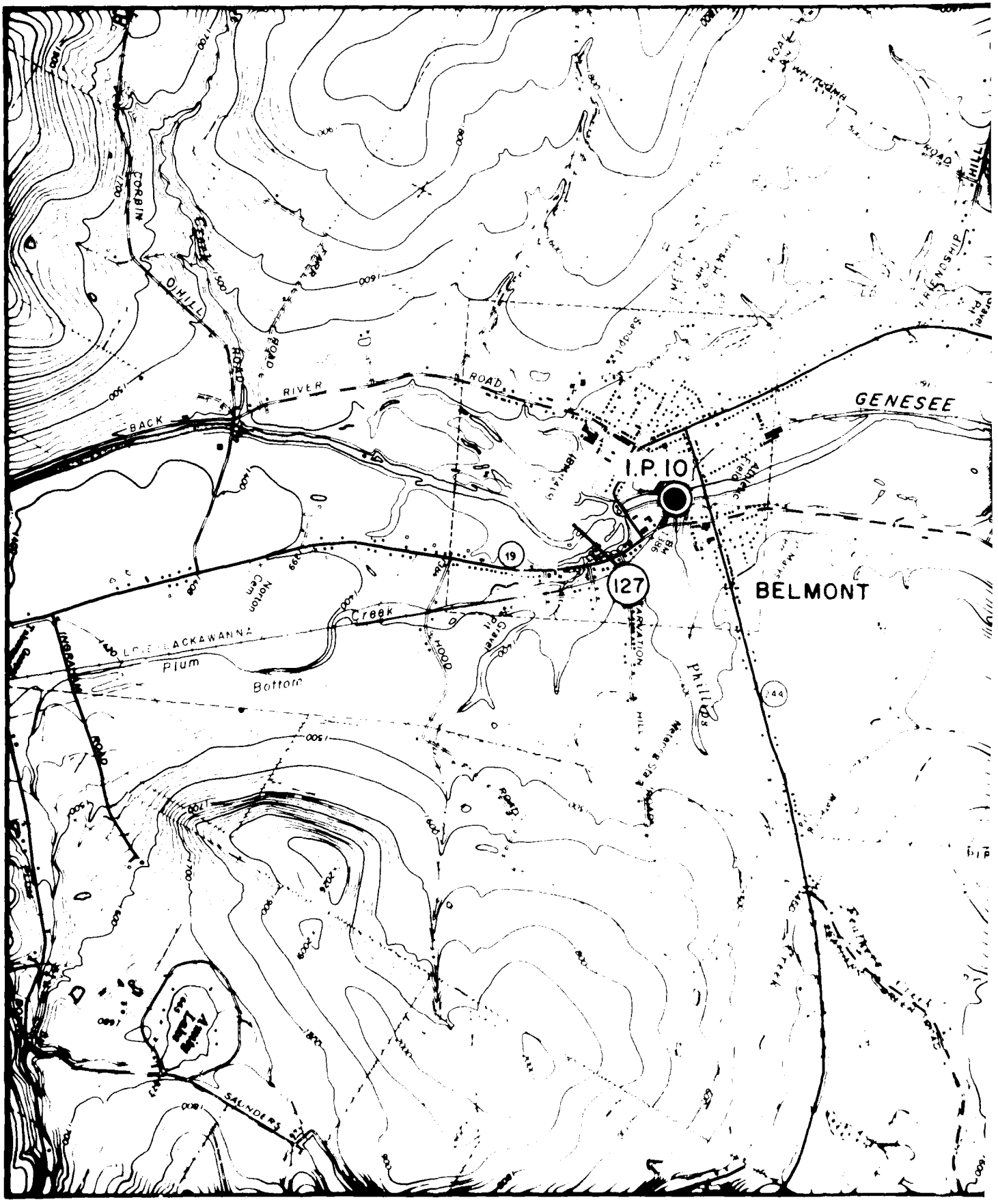


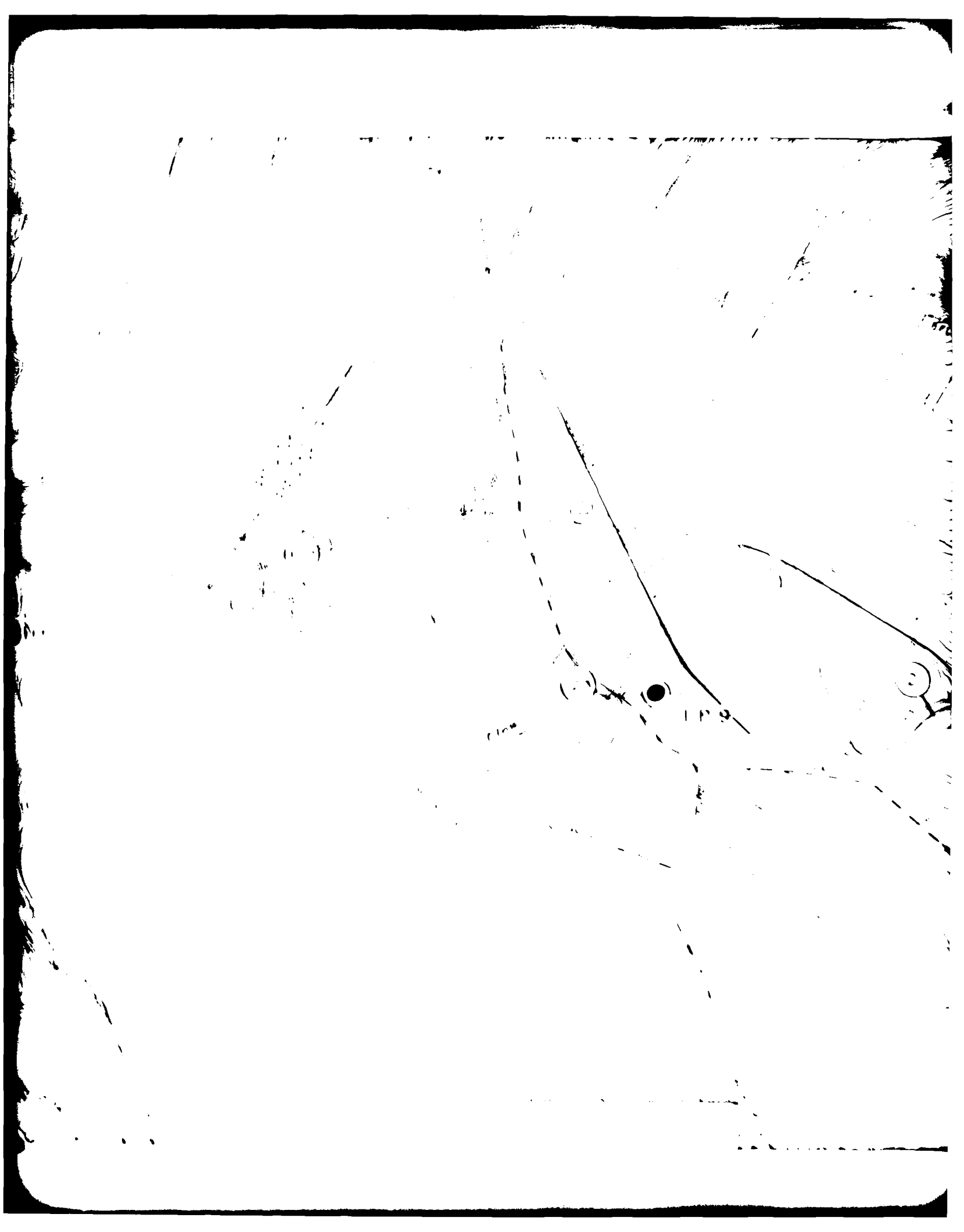
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN

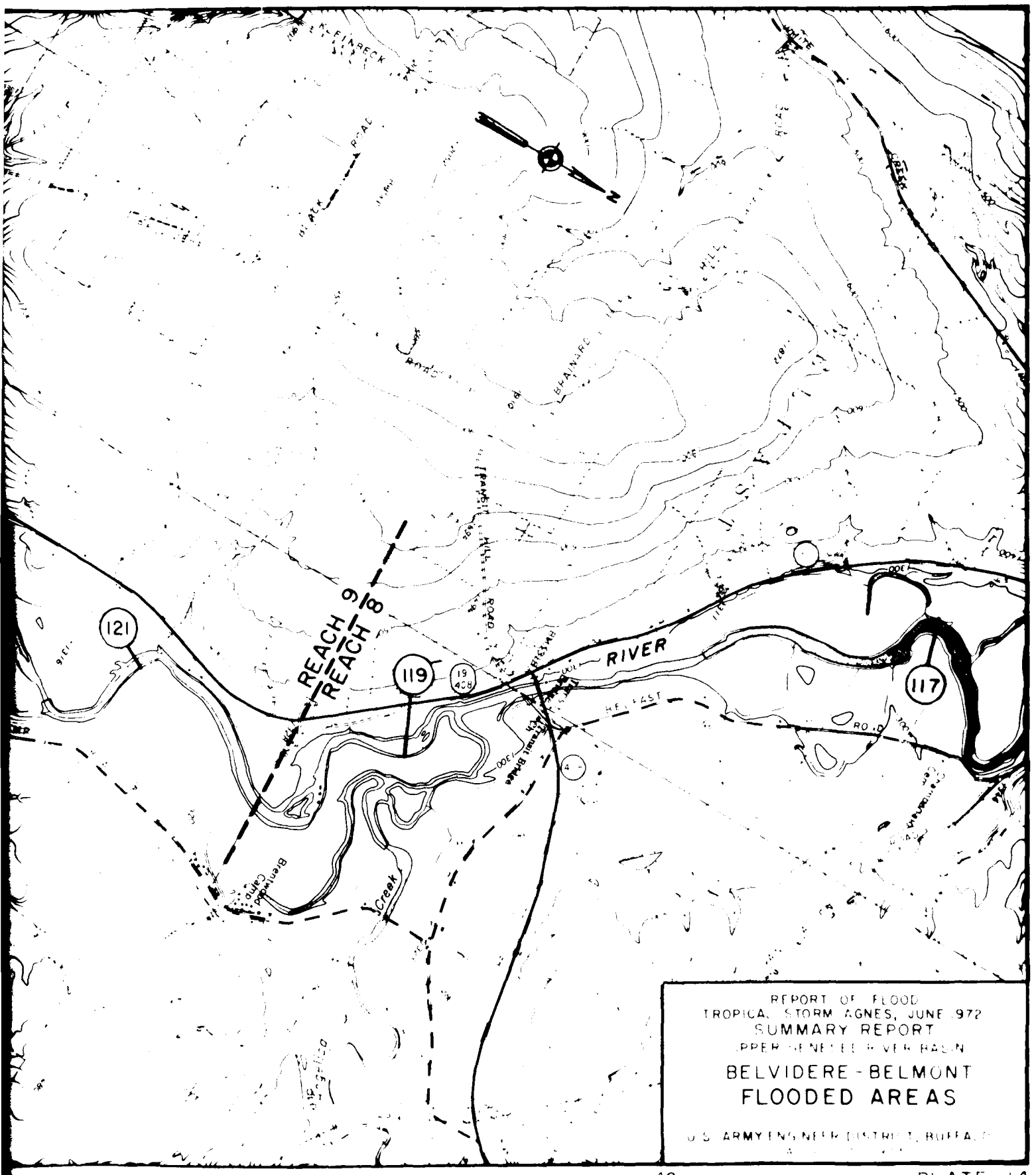
FILLMORE - BELFAST
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1972

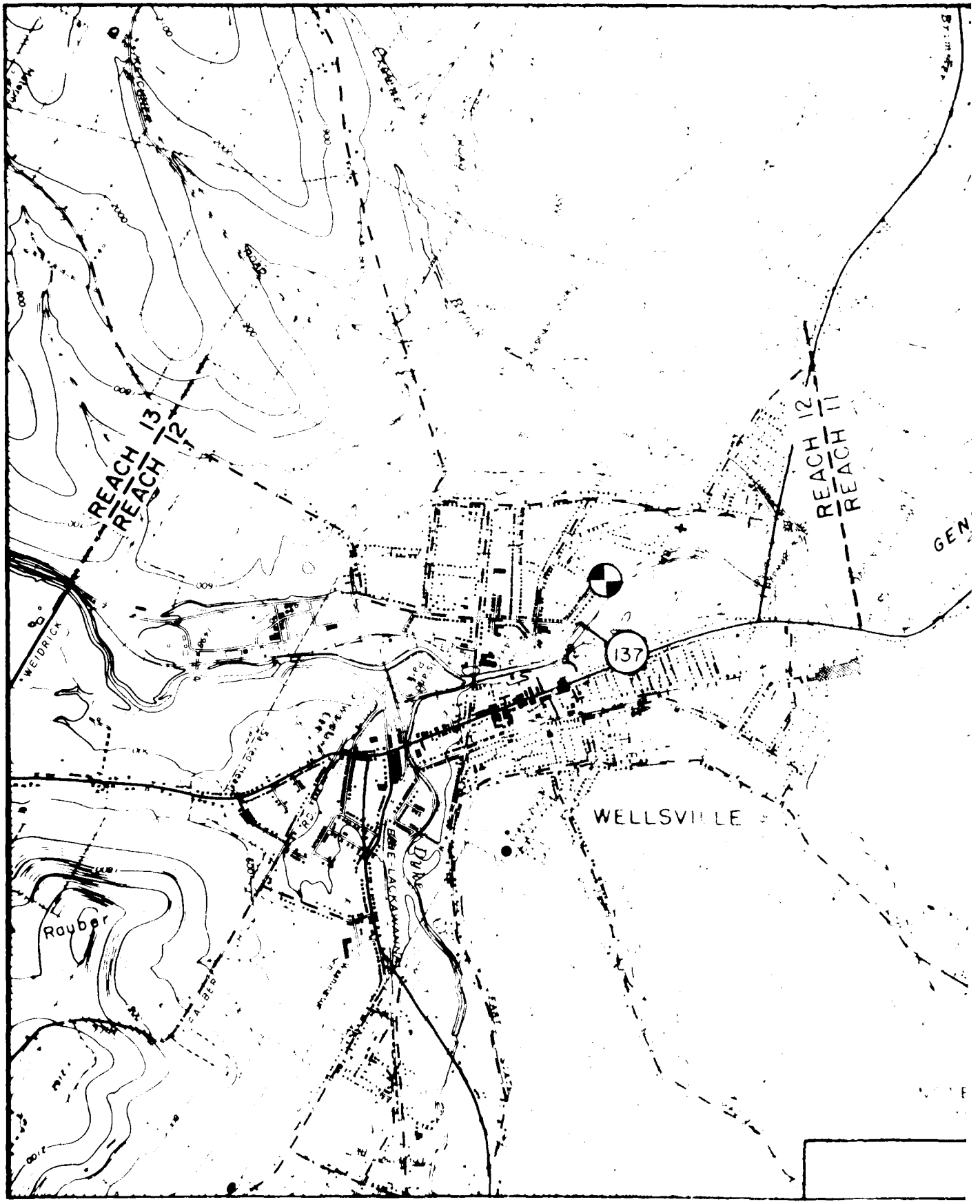
PLATE 13

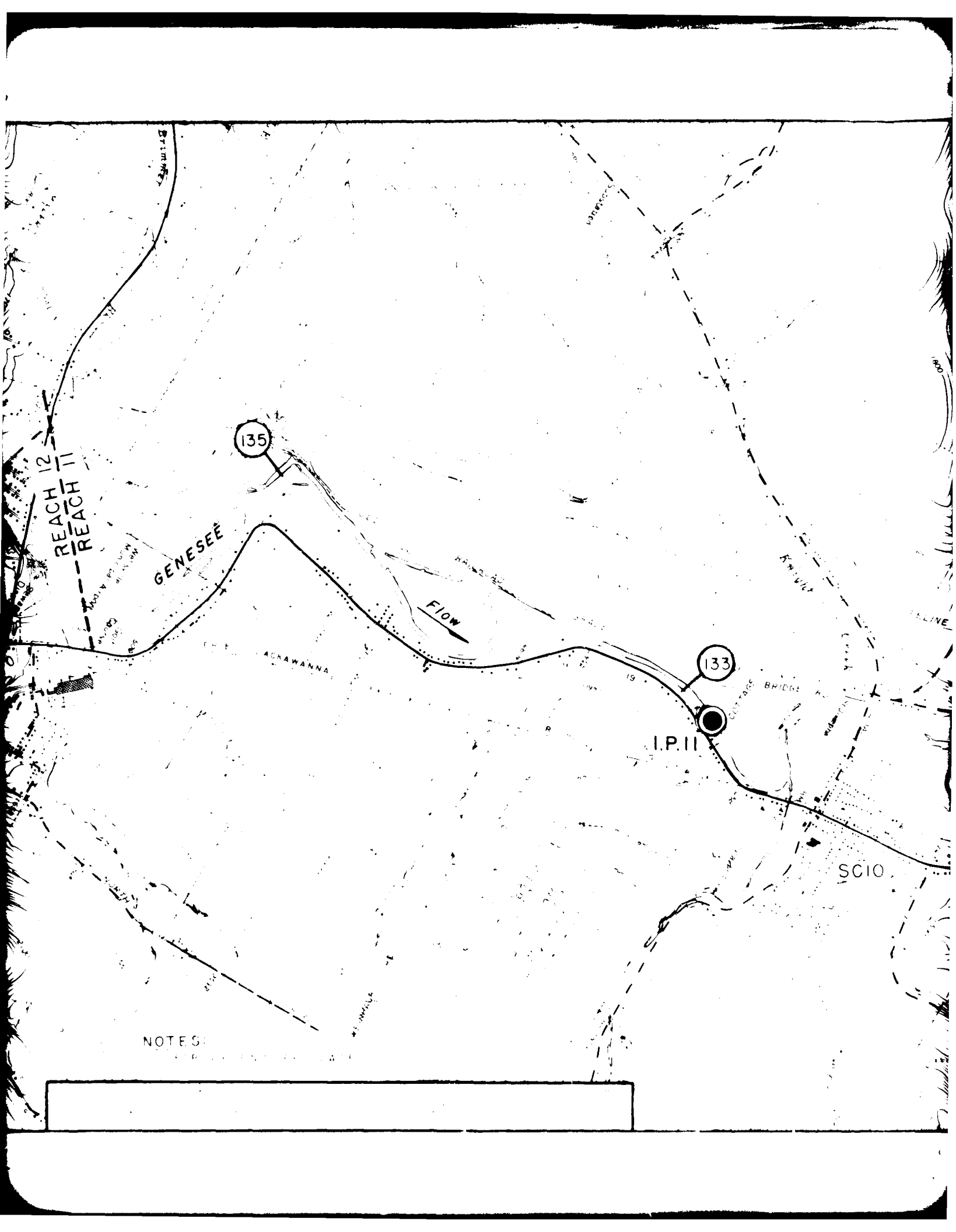

I.P. 107
BELMONT
GENESEE
RIVER ROAD
BACK
CORBIN HILL ROAD
Creek
Plum
Bottom
Creek
SAUNDERS
19
127
244

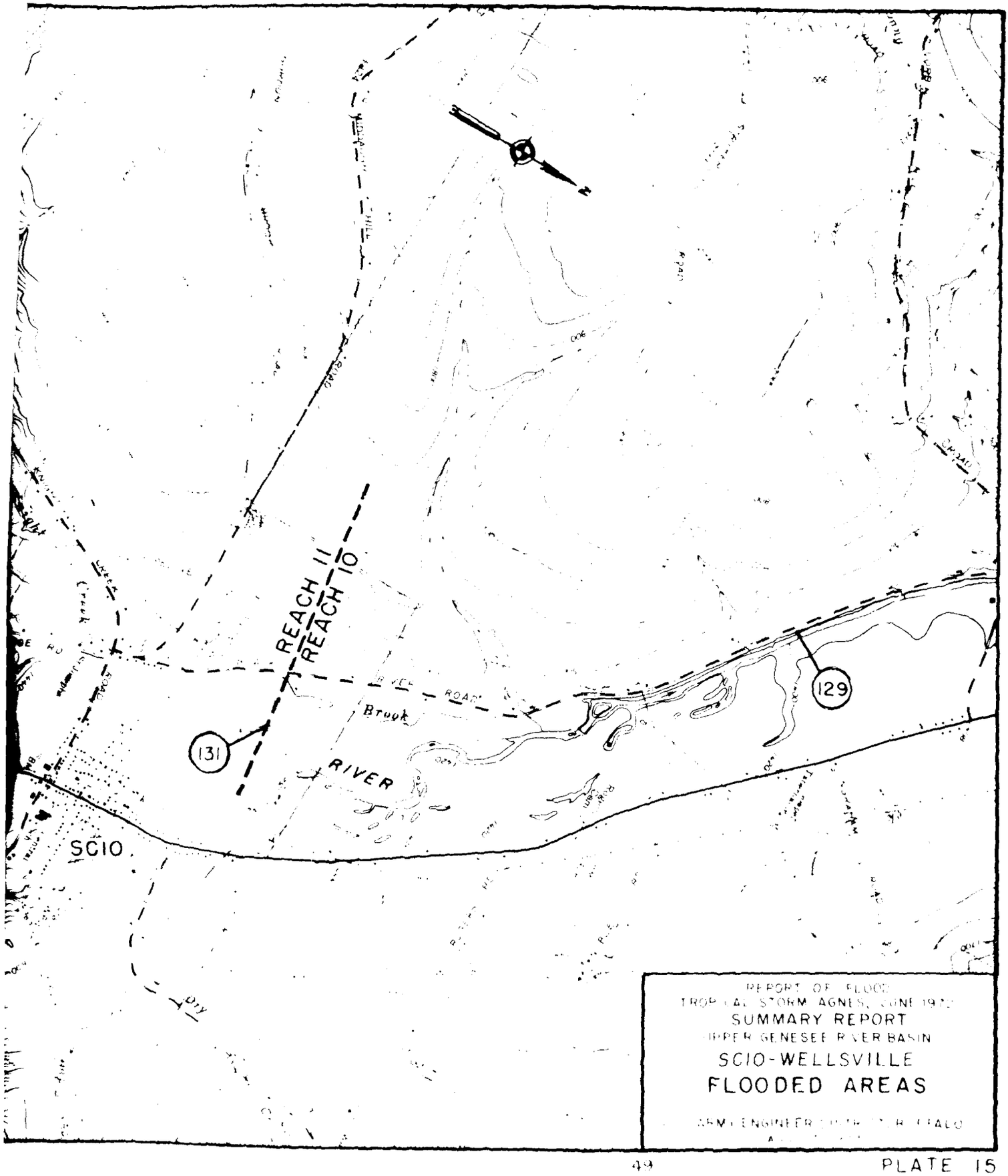




REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
BELVIDERE - BELMONT
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO

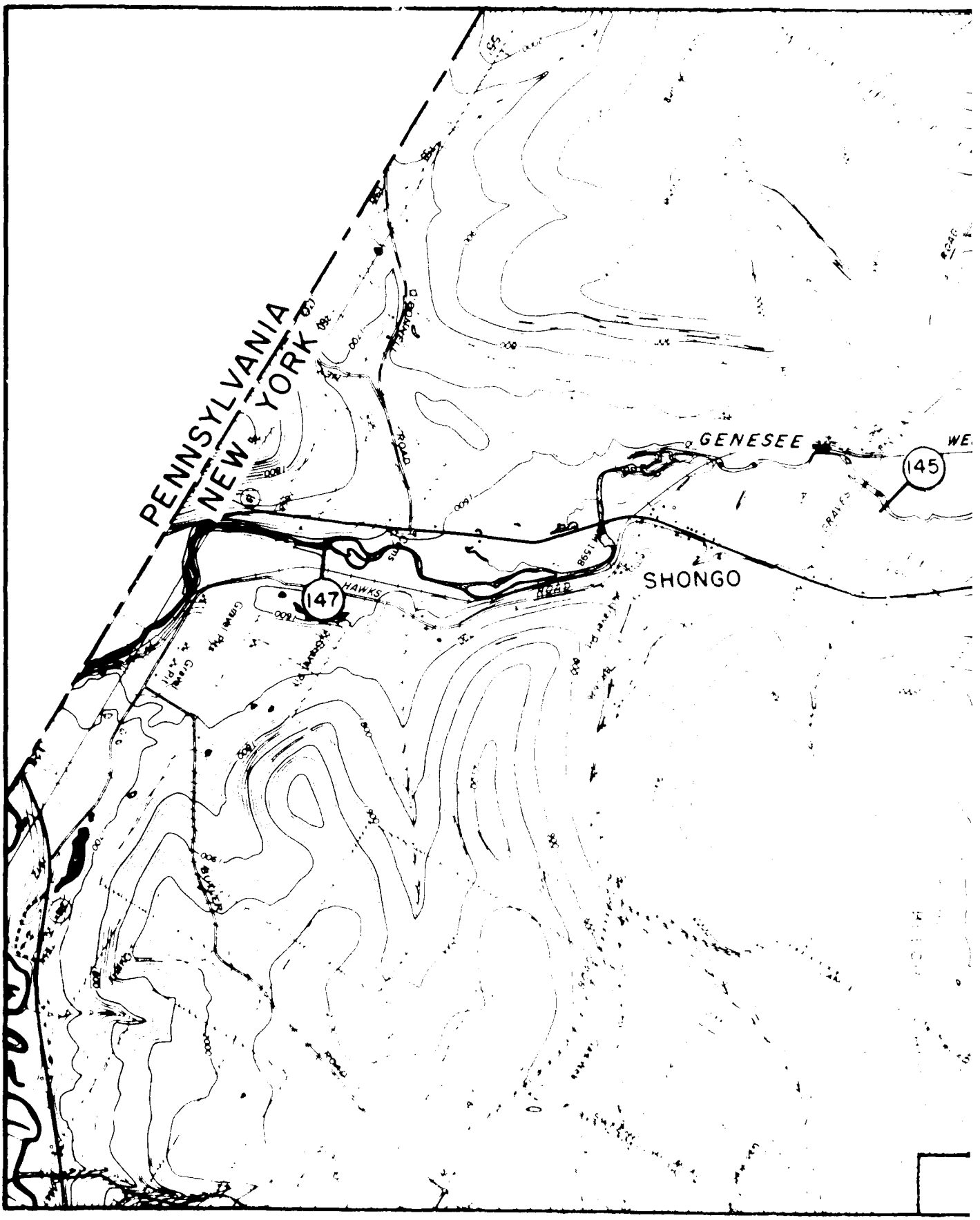

REACH 13
REACH 12
REACH 12
REACH 11
137
WEIDRICK
WELLSVILLE
Dyke
Rayber

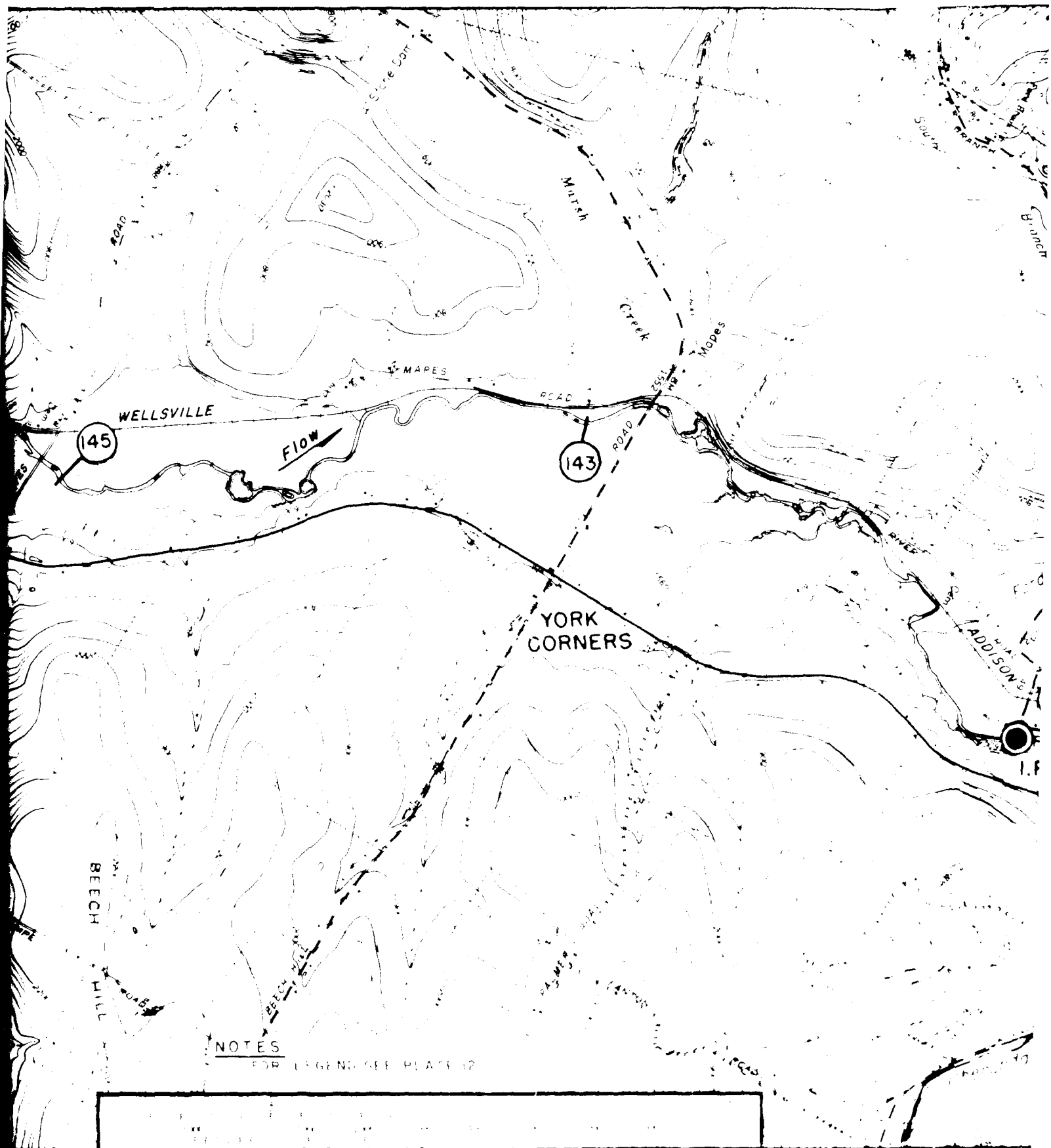

135
REACH 12
REACH 11
GENESEE
Flow
133
I.P.11
SCIO
NOTES:



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
SCIO-WELLSVILLE
FLOODED AREAS
ARMY ENGINEER DISTRICT BUFFALO

PLATE 15


PENNSYLVANIA
NEW YORK
GENESEE
145
147
SHONGO
HAWKS
ROAD


WELLSVILLE
145
FLOW
143
ROAD
MAPES
Mapes
Creek
Marsh
YORK
CORNERS
ADDISON
BEECH
HILL
NOTES
FOR LEGEND SEE PLATE 12

AD-A100 811 CORPS OF ENGINEERS BUFFALO N Y BUFFALO DISTRICT F/G 8/8
REPORT OF FLOOD, TROPICAL STORM AGNES, JUNE 1972. SUMMARY REPOR--ETC(U)
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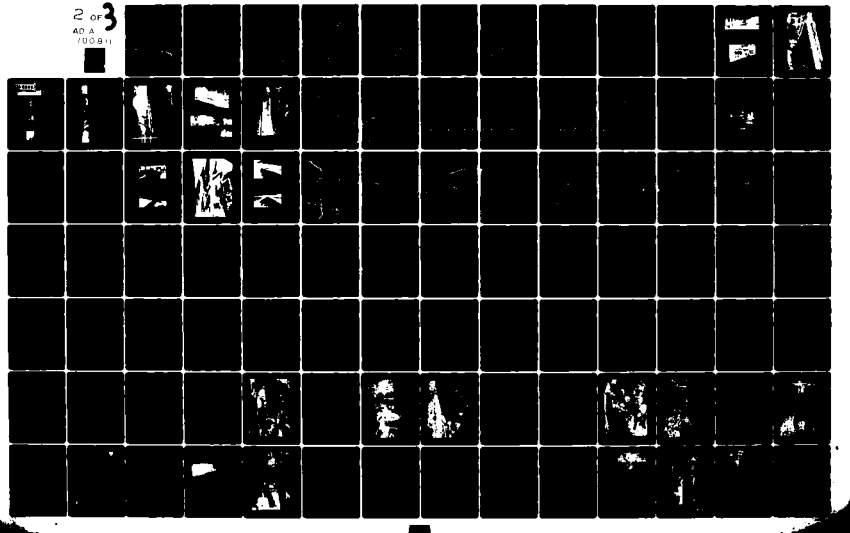
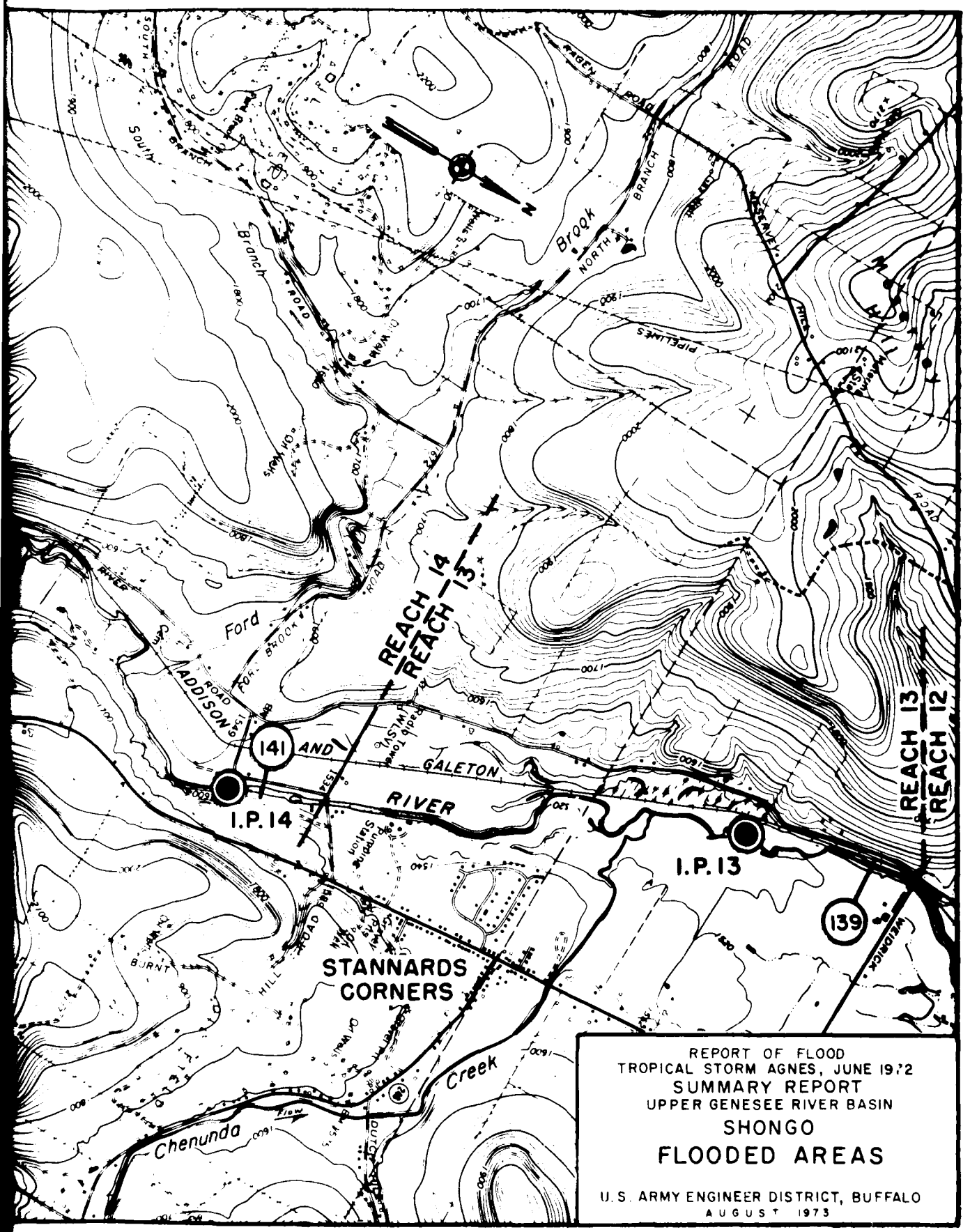
2 OF 3
AD A
100 811

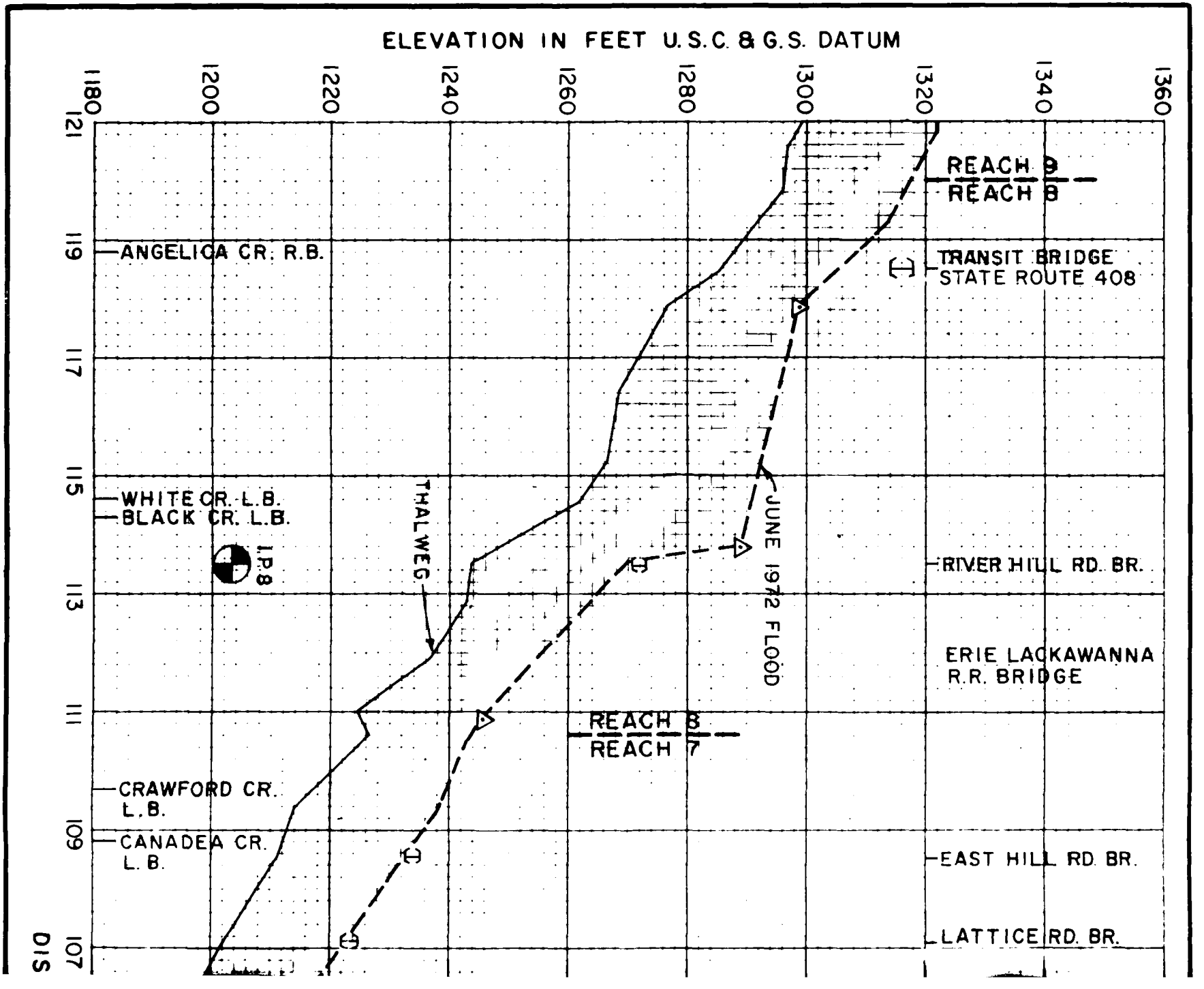


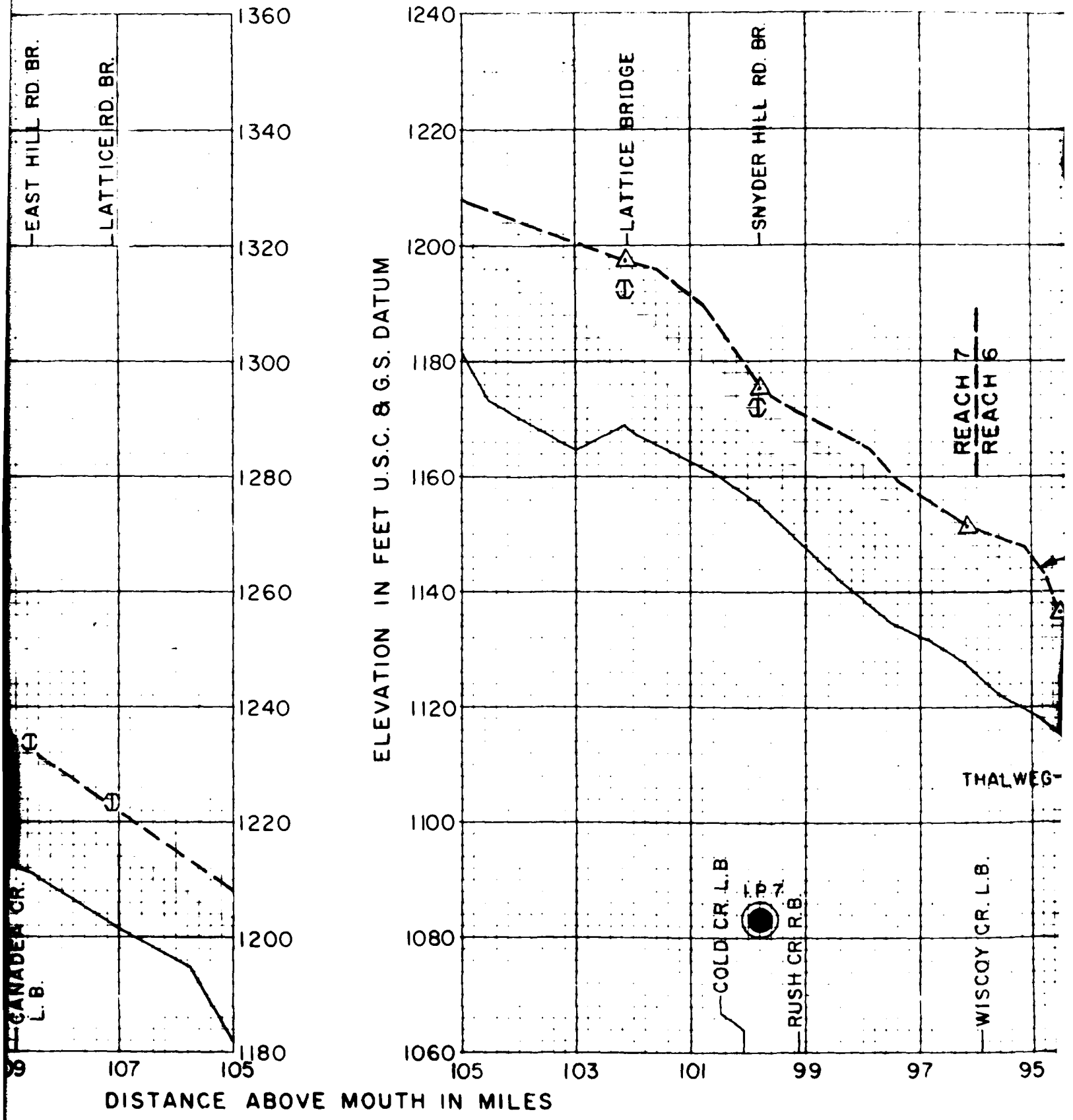


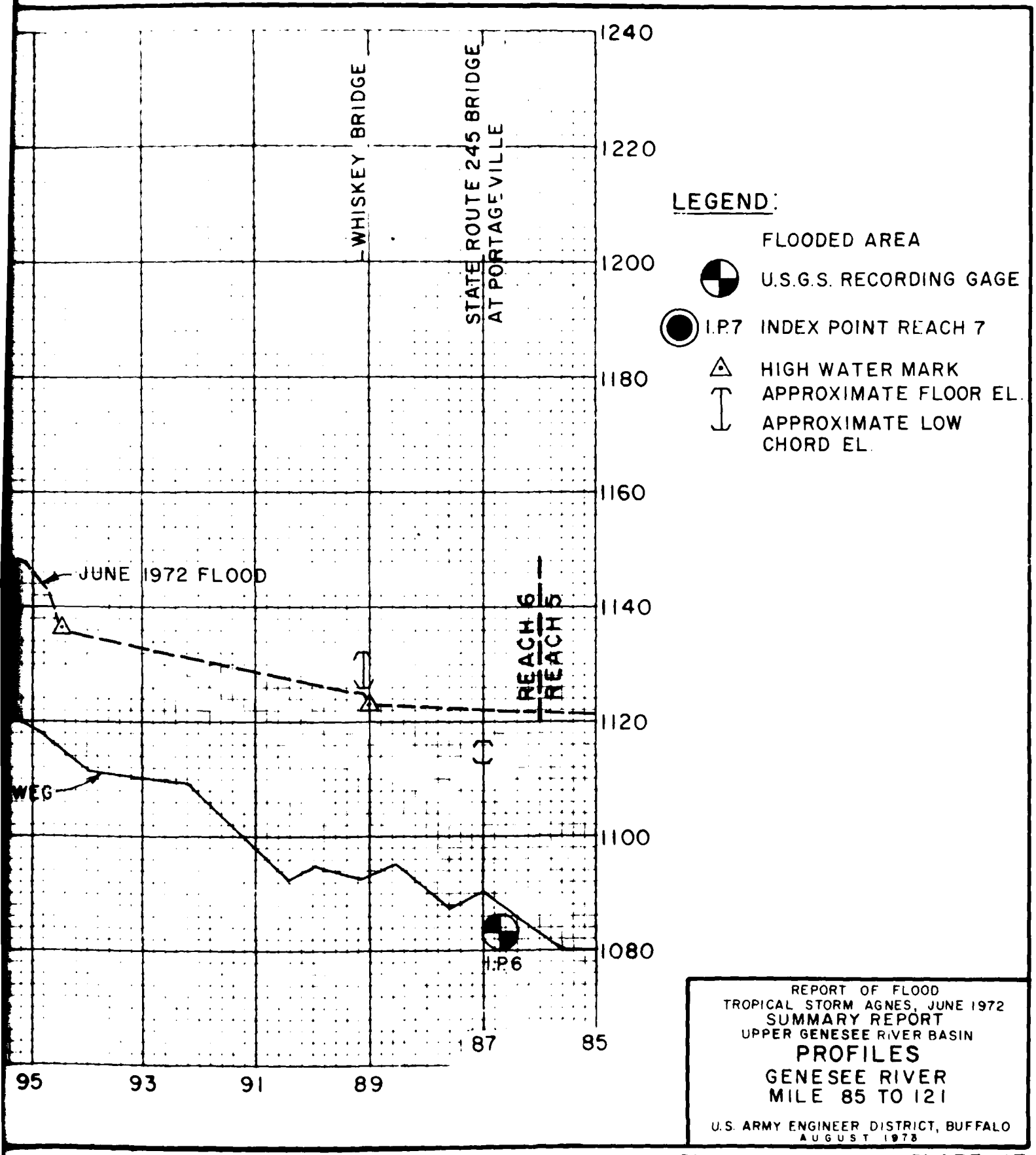
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
SHONGO
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 16


ELEVATION IN FEET U.S.C. & G.S. DATUM
1180
1200
1220
1240
1260
1280
1300
1320
1340
1360
121
119
117
115
113
111
109
107
DIS
ANGELICA CR. R.B.
WHITE CR. L.B.
BLACK CR. L.B.
I.P.8
THALWEG
JUNE 1972 FLOOD
REACH 9
REACH 8
TRANSIT BRIDGE
STATE ROUTE 408
RIVER HILL RD. BR.
ERIE LACKAWANNA
R.R. BRIDGE
REACH 8
REACH 7
CRAWFORD CR.
L.B.
CANADEA CR.
L.B.
EAST HILL RD. BR.
LATTICE RD. BR.

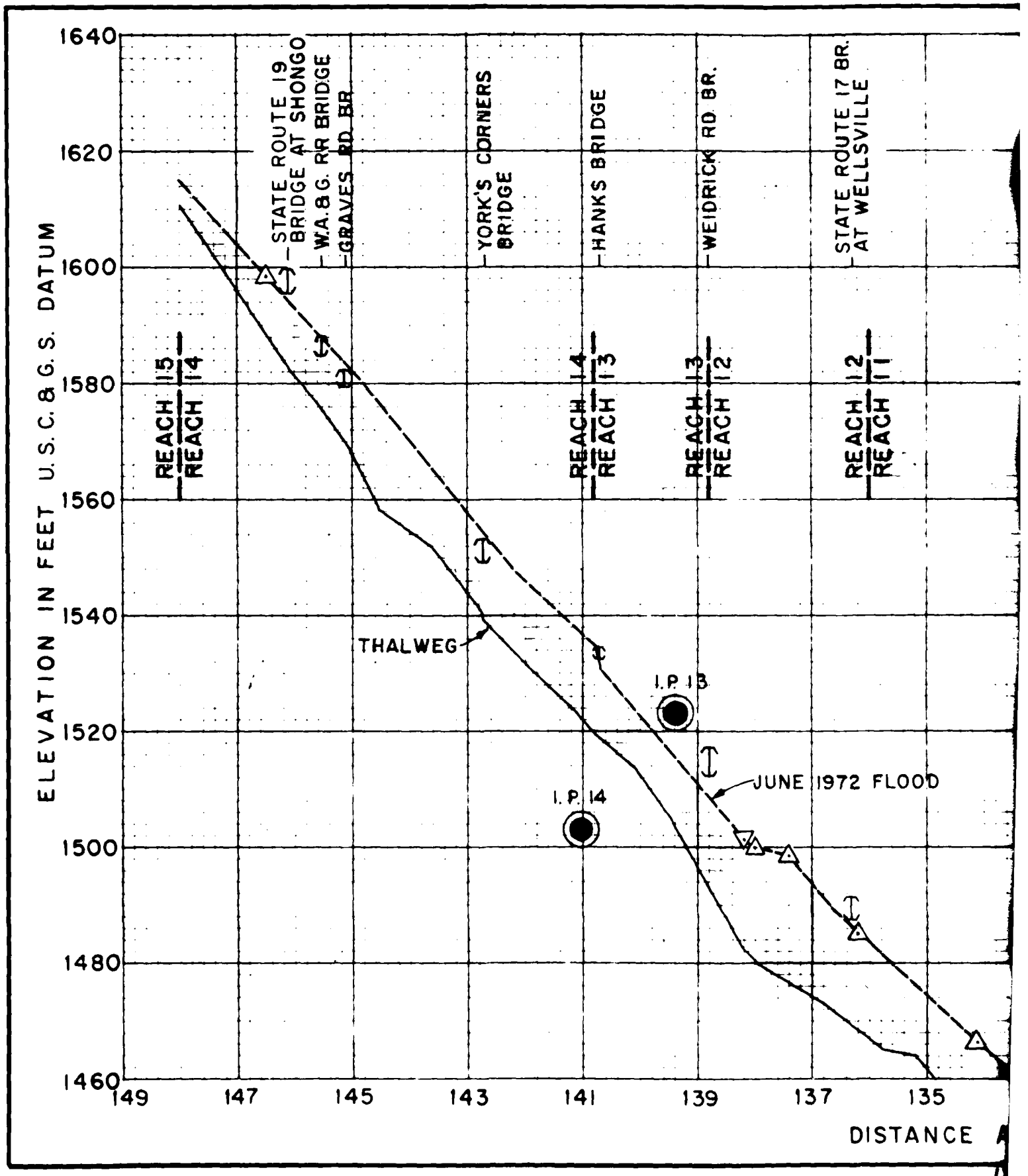

EAST HILL RD. BR.
LATTICE RD. BR.
LATTICE BRIDGE
SNYDER HILL RD. BR.
REACH 7
REACH 6
THALWEG
CANADEA CR. L.B.
COLD CR. L.B.
T.P.7
RUSH CR. R.B.
WISCOY CR. L.B.
ELEVATION IN FEET U.S.C. & G.S. DATUM
1360
1340
1320
1300
1280
1260
1240
1220
1200
1180
1240
1220
1200
1180
1160
1140
1120
1100
1080
1060
109
107
105
105
103
101
99
97
95
DISTANCE ABOVE MOUTH IN MILES

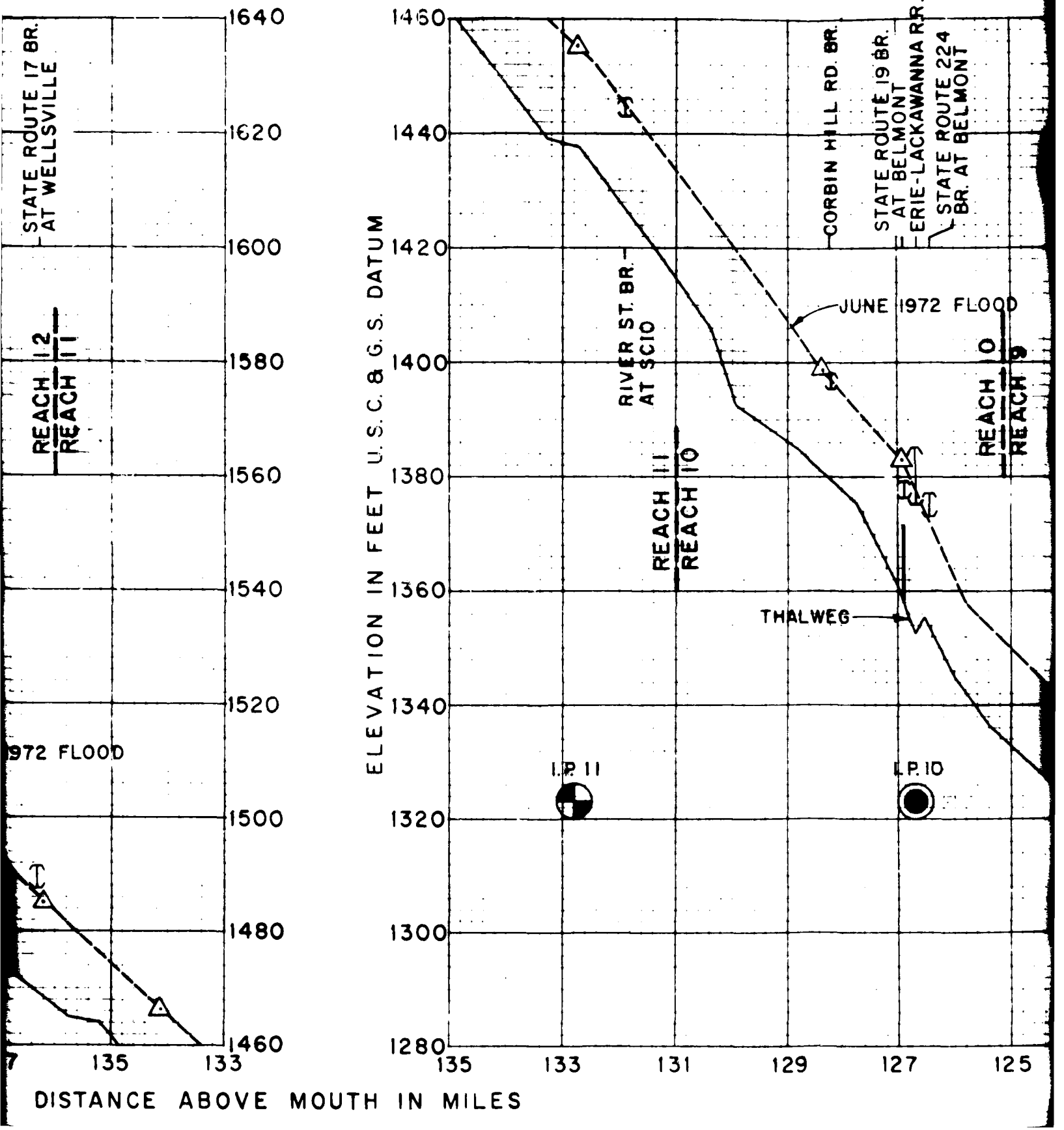


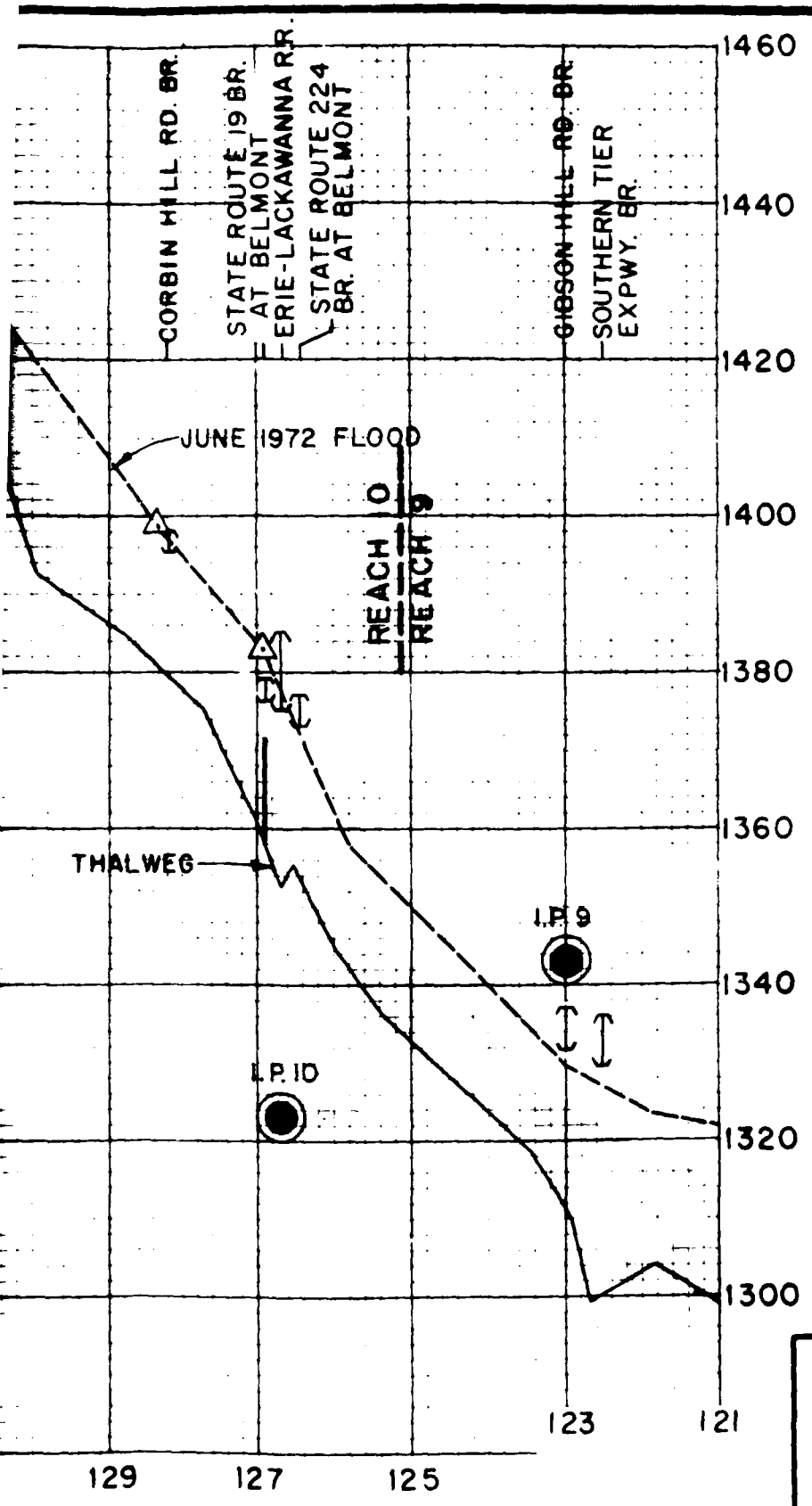
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN

PROFILES
GENESEE RIVER
MILE 85 TO 121

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973


ELEVATION IN FEET U.S.C.&G.S. DATUM
1640
1620
1600
1580
1560
1540
1520
1500
1480
1460
149
147
145
143
141
139
137
135
DISTANCE
STATE ROUTE 19 BRIDGE AT SHONGO
W.A.&G. RR BRIDGE
GRAVES RD BR
YORK'S CORNERS BRIDGE
HANKS BRIDGE
WEIDRICK RD BR.
STATE ROUTE 17 BR. AT WELLSVILLE
REACH 15
REACH 14
REACH 14
REACH 13
REACH 13
REACH 12
REACH 12
REACH 11
THALWEG
I.P. 13
I.P. 14
JUNE 1972 FLOOD


ELEVATION IN FEET U.S.C. & G.S. DATUM
1640
1620
1600
1580
1560
1540
1520
1500
1480
1460
1460
1440
1420
1400
1380
1360
1340
1320
1300
1280
STATE ROUTE 17 BR. AT WELLSVILLE
REACH 12
REACH 11
972 FLOOD
RIVER ST. BR. AT SC10
REACH 11
REACH 10
CORBIN HILL RD. BR.
STATE ROUTE 19 BR. AT BELMONT
ERIE-LACKAWANNA R.R.
STATE ROUTE 224 BR. AT BELMONT
JUNE 1972 FLOOD
REACH 10
REACH 9
THALWEG
I.P. 11
I.P. 10
7
135
133
135
133
131
129
127
125
DISTANCE ABOVE MOUTH IN MILES



NOTE:
FOR LEGEND SEE PLATE 17

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
PROFILES
GENESEE RIVER
MILE 121 TO 149

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 18

WELLSVILLE

This section of the report examines the area protected by the Local Flood Protection at Wellsville, NY, in the upper Basin. The existing project was completed in 1957.

After the June 1972 flood, the project was restored at a cost of approximately $355,000. Prior to the June 1972 flood, continued erosion problems indicated that certain deficiencies existed in the completed project. Revised figures on Genesee River discharges at the Scio gage location by the U.S. Geological Survey resulted in new discharge-frequency curves. These new curves necessitated a rectification project in order that the intended degree of protection at Wellsville be attained. A contract was awarded in June 1973 to rectify the deficiencies in the completed Local Flood Protection Project and construction is currently underway.

For residents of Wellsville, the hardest hit community in the Genesee River Basin, the June 1972 flood will not be forgotten. During a three-day period, their village was submerged by a deluge, causing millions of dollars in damage, as well as inestimable personal hardship. A flooded area and damage reach map is shown on Plate 19.

A water surface profile of the flood on both the Genesee River and Dyke Creek is shown on Plate 20.

The disaster-laden rain began to fall at approximately 9 p.m. on 20 June. By 9 a.m. on 21 June, approximately 7 inches of rain had fallen. By 2 a.m. on 23 June, Wellsville Municipal Water and Light plant had recorded approximately 13.4 inches of rain.

As reports of excessive rainfall reached Buffalo District personnel on the morning of 21 June, their immediate and continual efforts to contact the village were thwarted by washed-out power and telephone lines. Communication to and from Wellsville was almost non-existent. For all practical purposes, access to and from Wellsville was impossible, except by air. Wellsville was isolated by rapidly rising water.

The flood exhibited two distinct and pronounced peaks. The first occurred at approximately 1 p.m. on 21 June. The water subsided, somewhat, on the 22nd to below flood stage at some areas. At approximately 3 p.m. on 22 June, however, the water slowly began to rise; at 6 p.m. its ascent was rapid. The second peak crested on 23 June between 2 and 5 p.m., after which, the water receded. Each peak was a flood of record in Wellsville; the second was approximately 1 foot higher than the first.

The most spectacular effect of the flood was the collapse of the west wing of Jones Memorial Hospital and the Lutheran Parish Hall just downstream of it. (See Figures 14 and 15). Anticipating structural failure, hospital officials evacuated patients from the west wing, and utilities to the wing were shut off and bypassed to avoid any danger of explosion or fire. The evening prior to the collapse, Buffalo District personnel were enroute to the area with sandbags. Junked automobiles were lowered into the river by local efforts, to divert the surging waters from undermining the foundation. Attempts to save the structures failed; the hospital and the Lutheran Parish Hall plunged into the Genesee River at approximately 6 a.m. on 23 June. The undamaged part of the hospital was kept operational by portable generators provided by the Erie County Civil Defense. Total damage to the hospital was estimated to be approximately 3.5 million dollars.

Figures 16 through 22 show flooding conditions in the Wellsville area.

Estimated June 1972 flood damages are given, by reach, for the Genesee River and Dyke Creek in Wellsville in Table 11.

Table 11. Total Estimated Damages in the Wellsville Area (1)

Reach	Total Estimated June 1972 Flood Damage				
	Residential	Commercial	Public and Other	Agricultural	Reach Total
	$	$	$	$	$
Genesee River					
G-1	-	116,000	23,000		139,000
G-2	11,000	5,000	16,000		32,000
G-3	166,000	161,000	4,343,000		4,670,000
G-4	168,000	-	671,000		839,000
G-5A	114,000	111,000	232,000		457,000
G-5B	7,000	9,000	8,000		24,000
G-6(3)	-	710,000	240,000		950,000
Dyke Creek					
D-1	26,000	387,000	126,000		539,000
D-2	230,000	1,011,000	97,000		1,338,000
D-3	510,000	-	229,000		739,000
D-4	66,000	232,000	106,000		404,000
D-5(3)	225,000	1,630,000	80,000		1,935,000
(2)				5,000	5,000
TOTAL	1,523,000	4,372,000	6,171,000	5,000	12,071,000

(1) Includes only damage directly attributable to Genesee River and Dyke Creek
(2) Agricultural damage was small and therefore not broken down into reaches.
(3) Outside of existing local protection project area.

Figure 14 West wing of Jones Memorial Hospital. Photo taken 22 June 1972.

Figure 15 Aerial view of Lutheran Parish Hall on the left and Jones Memorial Hospital on the right. Photo taken 23 June 1972.

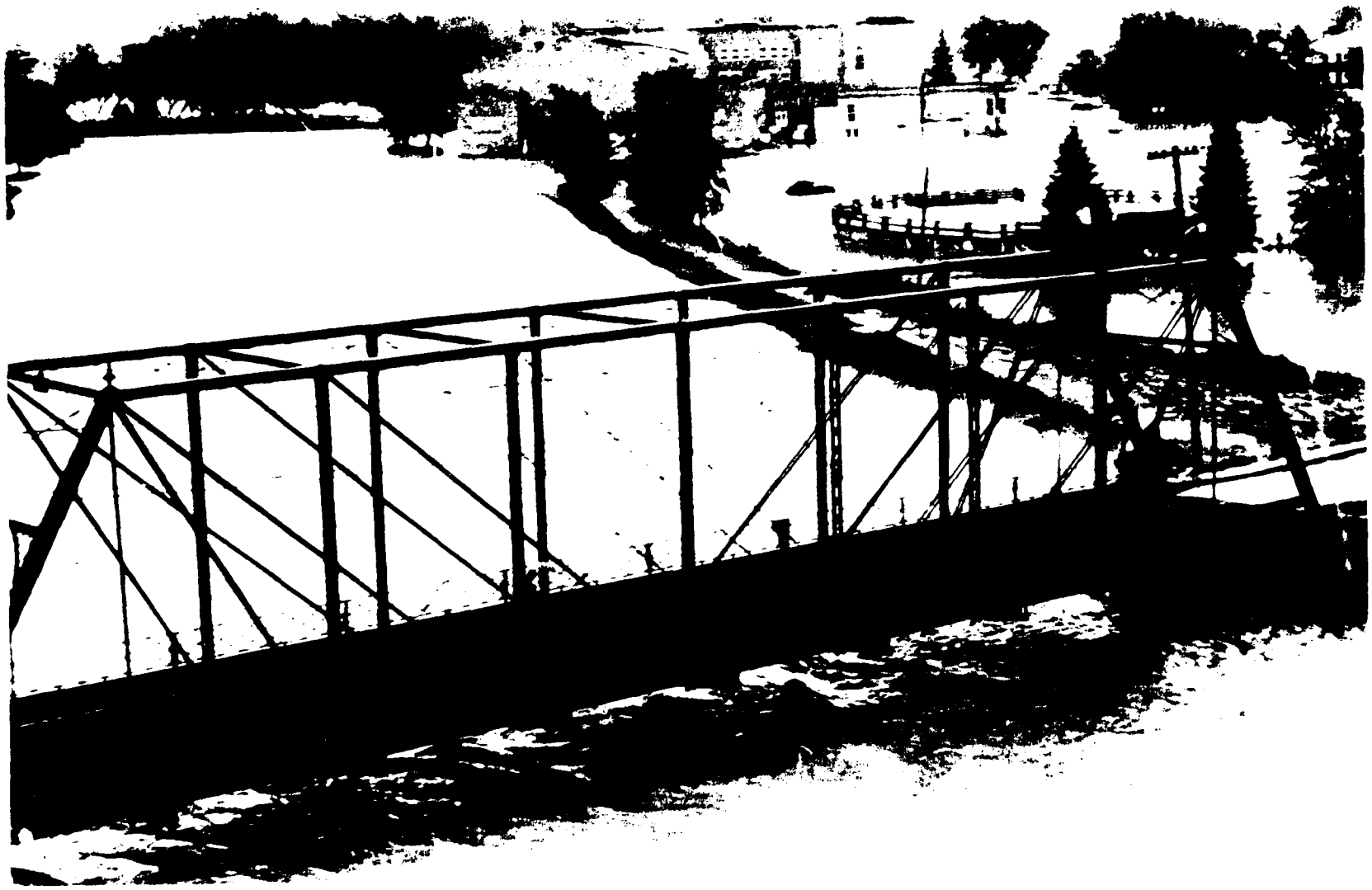


Figure 16. Looking upstream along Genesee River at Pearl St. bridge with State St. bridge and High School in background. Photo taken from Jones Memorial Hospital before collapse 21 June 1972.

Figure 17 Flooding along South Main St. looking south toward Dyke Creek. Photo taken 21 June 1972.

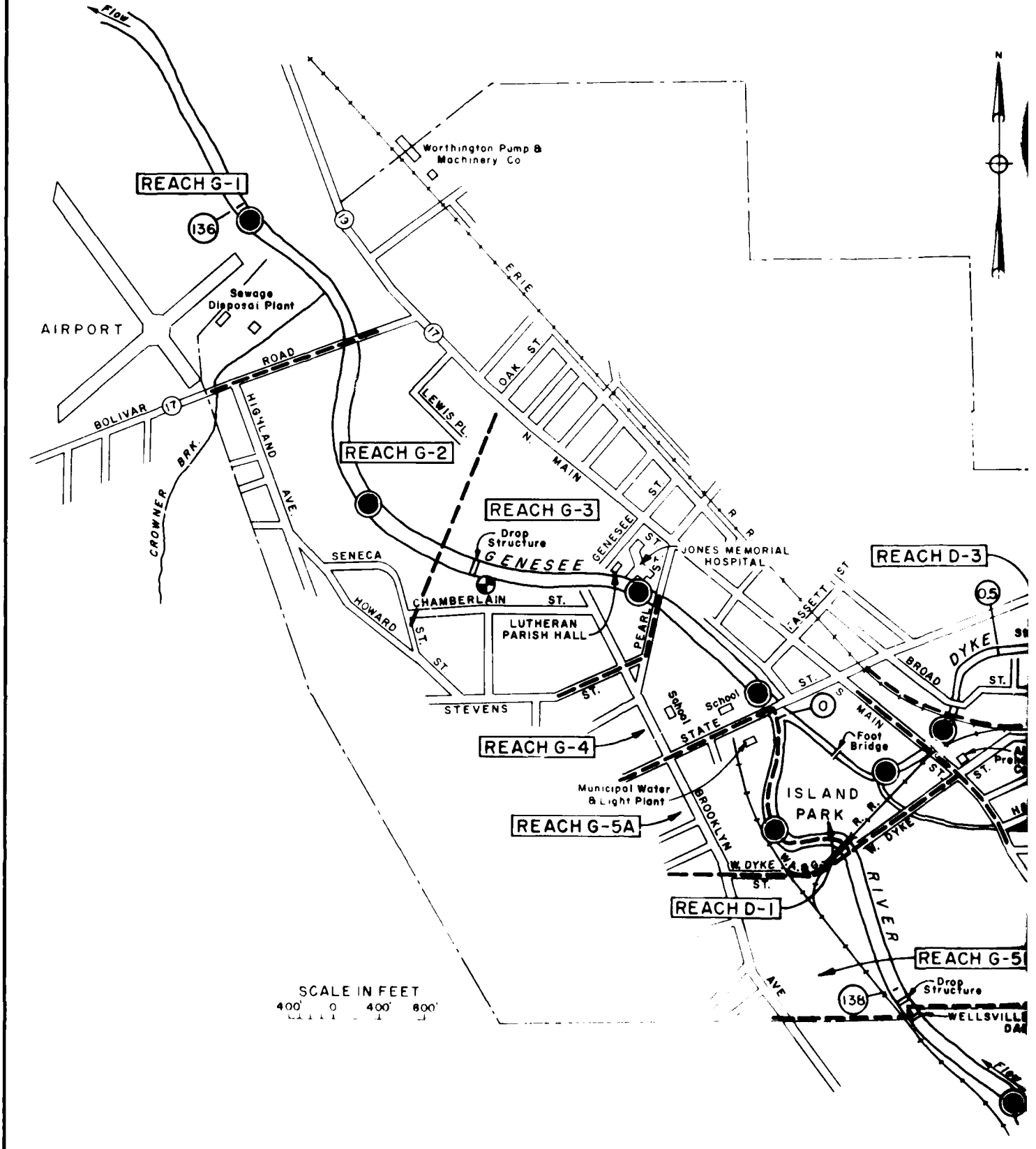
Figure 18 Looking downstream along Dyke Creek at the South Main St. bridge. Photo taken 21 June 1972.

Figure 19 Upstream face of Broad Street bridge. Area in the background was severely damaged. Photo taken on 21 June 1972 near the first peak.

Figure 20 Debris laden upstream face of Broad St. bridge across Dyke Creek. Photo taken 23 June 1972.

Figure 21 Looking south from the right abutment, across Dyke Creek, after the collapse of the Miller St. bridge. Photo taken 21 June 1973.

[illegible] Water was approximately 3 feet deep in the [illegible]. There is a black top parking lot under the mud. Photo taken 21 June 1972.


Flow
REACH G-1
136
Worthington Pump & Machinery Co
Sewage Disposal Plant
AIRPORT
ROAD
BOLIVAR
17
CROWNER BRK.
HIGHLAND AVE.
REACH G-2
LEWIS PL.
OAK ST.
ERIE
N. MAIN ST.
R R
REACH G-3
Drop Structure
GENESEE
GENESEE ST.
JONES MEMORIAL HOSPITAL
REACH D-3
SENECA
HOWARD ST.
CHAMBERLAIN ST.
LUTHERAN PARISH HALL
PEARL ST.
ASSETT ST.
DYKE
BROAD ST.
STEVENS ST.
School
STATE
MAIN
Foot Bridge
REACH G-4
Municipal Water & Light Plant
BROOKLYN
ISLAND PARK
REACH G-5A
W. DYKE
REACH D-1
RIVER
REACH G-5
Drop Structure
138
WELLSVILLE
DAM
AVE
SCALE IN FEET
400' 0 400' 800'

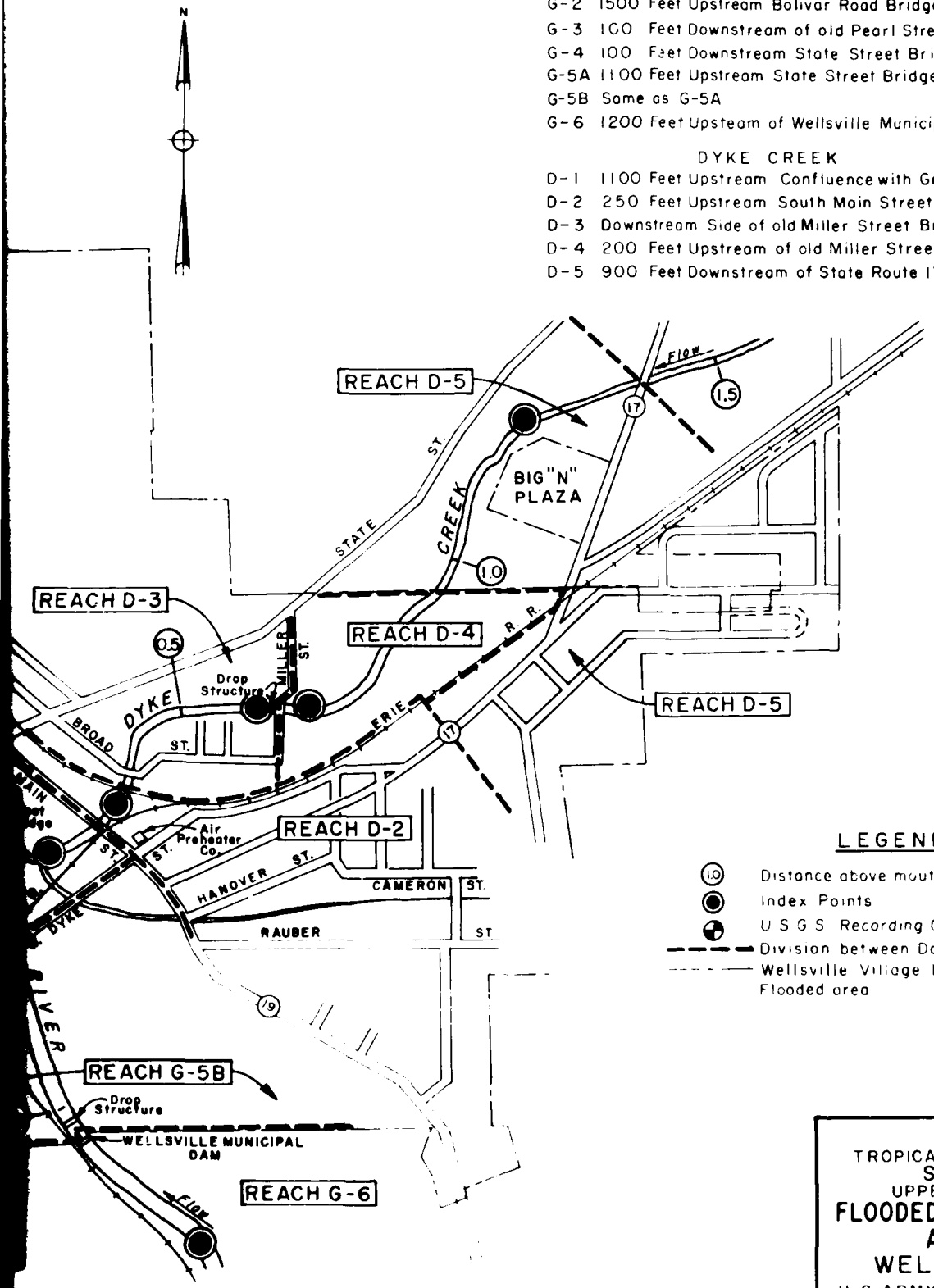
DAMAGE REACH INDEX POINTS

GENESEE RIVER

G-1 1400 Feet Downstream of Bolivar Road Bridge
G-2 1500 Feet Upstream Bolivar Road Bridge
G-3 100 Feet Downstream of old Pearl Street Bridge
G-4 100 Feet Downstream State Street Bridge
G-5A 1100 Feet Upstream State Street Bridge
G-5B Same as G-5A
G-6 1200 Feet Upstream of Wellsville Municipal Dam

DYKE CREEK

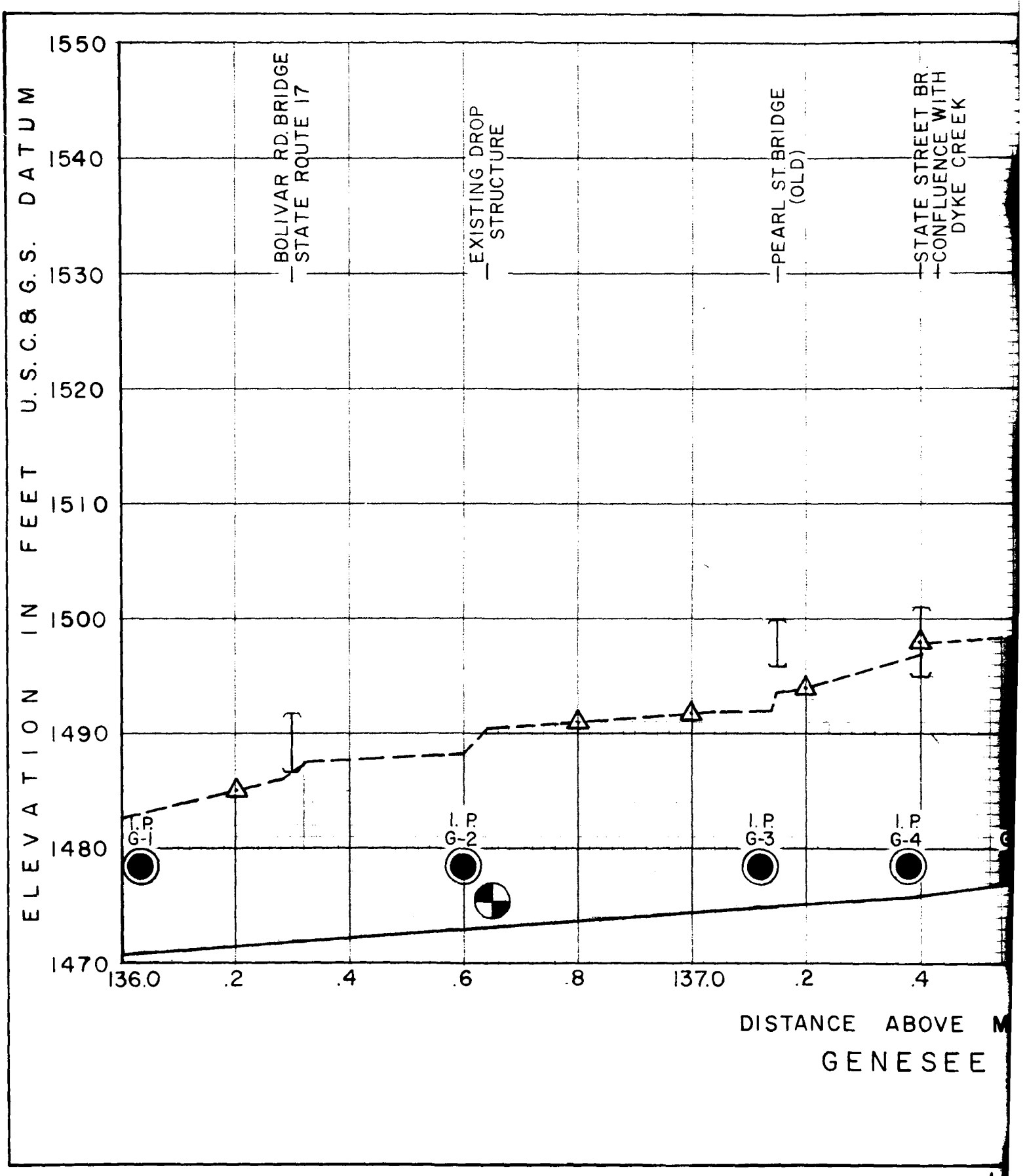
D-1 1100 Feet Upstream Confluence with Genesee River
D-2 250 Feet Upstream South Main Street Bridge
D-3 Downstream Side of old Miller Street Bridge
D-4 200 Feet Upstream of old Miller Street Bridge
D-5 900 Feet Downstream of State Route 17 (Upstream end of plaza)

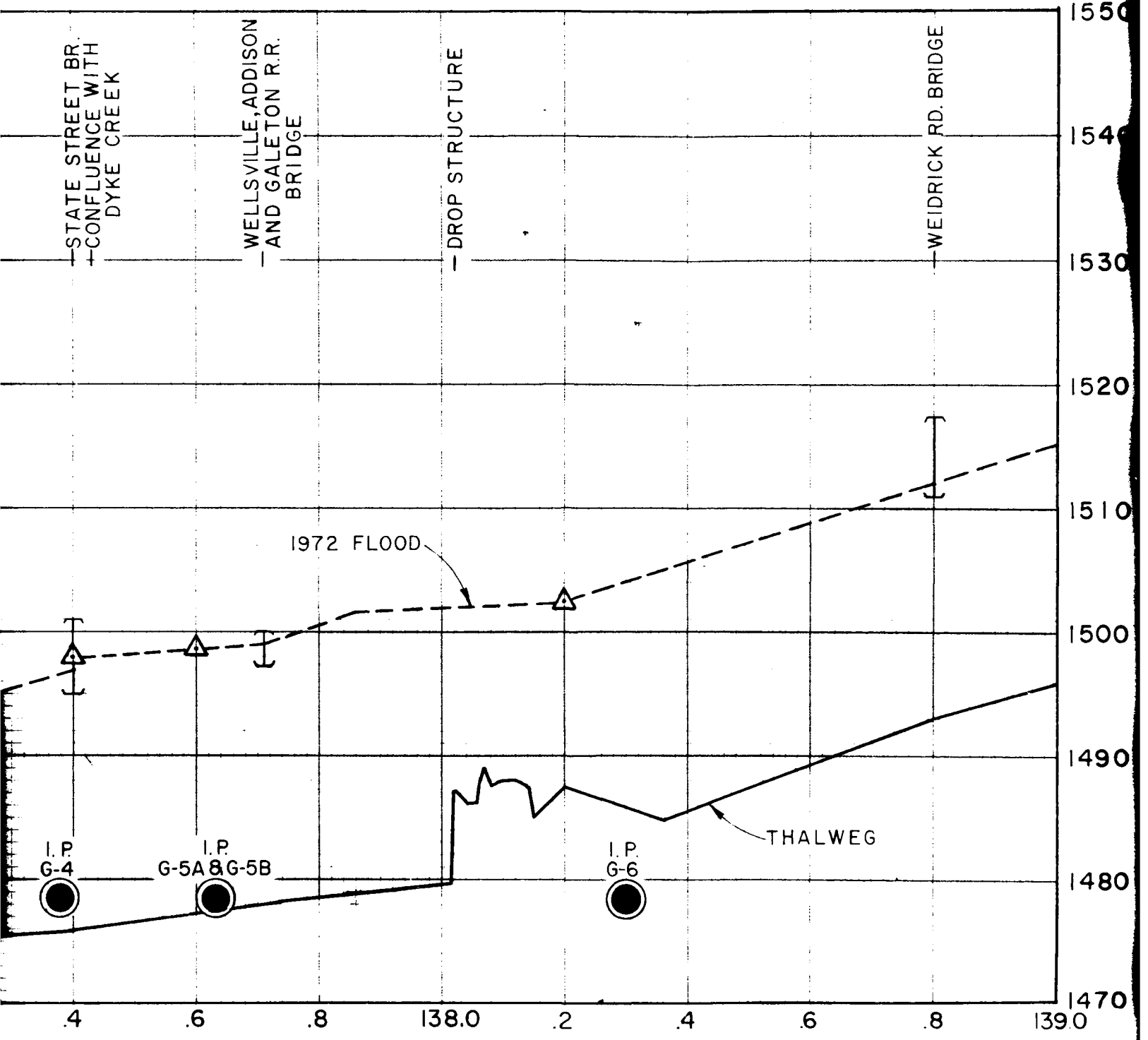


LEGEND

(1.0) Distance above mouth in miles
Index Points
U S G S Recording Gage
Division between Damage Reaches
Wellsville Village Line
Flooded area

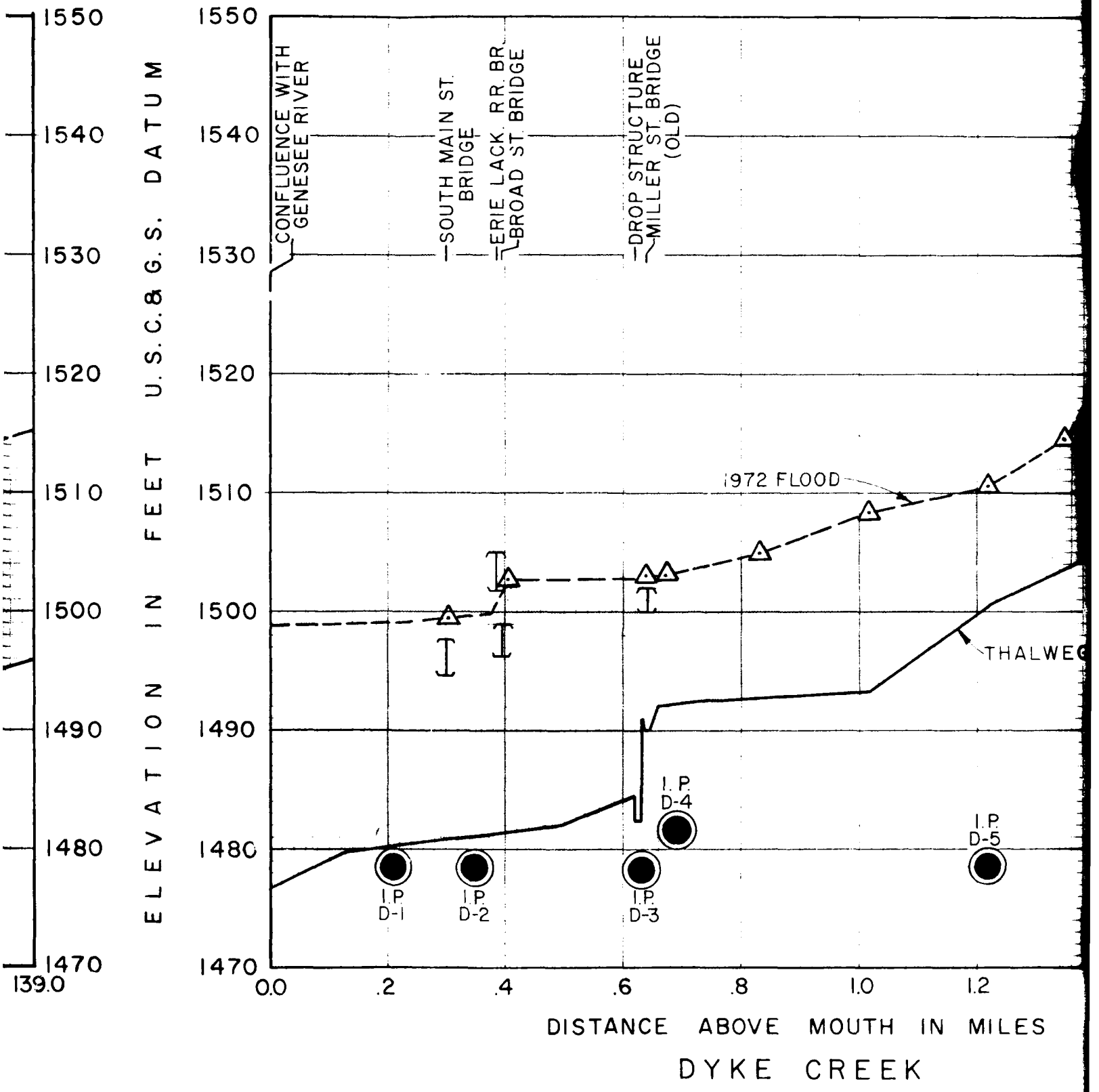
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
FLOODED AREA, DAMAGE REACHES AND INDEX POINTS
WELLSVILLE, NEW YORK
U S ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

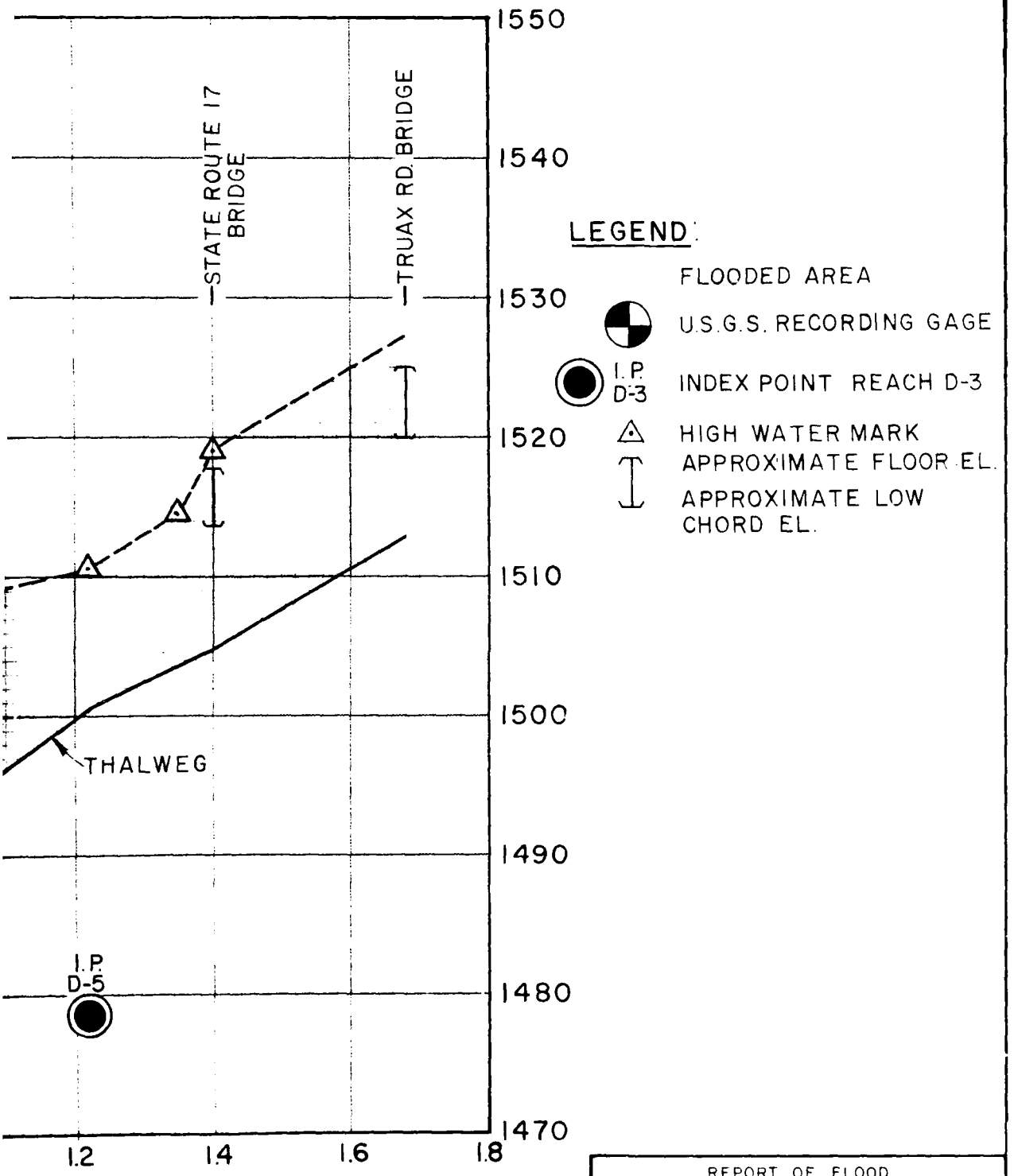

ELEVATION IN FEET U.S.C.&G.S. DATUM
1550
1540
1530
1520
1510
1500
1490
1480
1470
BOLIVAR RD. BRIDGE
STATE ROUTE 17
EXISTING DROP
STRUCTURE
PEARL ST. BRIDGE
(OLD)
STATE STREET BR.
CONFLUENCE WITH
DYKE CREEK
I.P.
G-1
I. P.
G-2
I. P.
G-3
I. P.
G-4
136.0
.2
.4
.6
.8
137.0
.2
.4
DISTANCE ABOVE M
GENESEE



ABOVE MOUTH IN MILES

ENESEE RIVER


1550
1540
1530
1520
1510
1500
1490
1480
1470
139.0
ELEVATION IN FEET U.S.C.& G.S. DATUM
CONFLUENCE WITH GENESEE RIVER
SOUTH MAIN ST. BRIDGE
ERIE LACK. RR. BR.
BROAD ST. BRIDGE
DROP STRUCTURE
MILLER ST. BRIDGE (OLD)
1972 FLOOD
THALWEG
I.P. D-1
I.P. D-2
I.P. D-3
I.P. D-4
I.P. D-5
0.0
.2
.4
.6
.8
1.0
1.2
DISTANCE ABOVE MOUTH IN MILES
DYKE CREEK



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN

PROFILES
GENESEE RIVER AND
DYKE CREEK
AT WELLSVILLE N Y

U.S. ARMY ENGINEER DISTRICT, BUFFALO

CONESUS, HONEOYE, CANADICE AND HEMLOCK LAKES

These lakes are located in the eastern part of the Genesee River Basin and drain into the lower Genesee River. Conesus and Honeoye Lakes are used primarily for recreation while Canadice and Hemlock Lakes are used primarily for water supply. For this reason, the flood damage is higher on Conesus and Honeoye Lakes than on Canadice and Hemlock. Table 12 shows total estimated June 1972 flood damage on all lakes except Canadice where minimal damage occurred.

Table 12. Total Estimated Damage on Conesus, Honeoye, and Hemlock Lakes

Lake	Total Estimated June 1972 Flood Damage			
	Residential	Commercial	Public & Other	Total
Conesus	$254,000	$28,000	$ 3,000	$285,000
Honeoye	117,000	12,000	1,000	130,000
Hemlock	-	-	38,000	38,000

The June 1972 flood resulted in record high lake stages on Conesus Lake and probably Honeoye Lake. (Records on Honeoye Lake have not been kept long enough to yield meaningful results.) Stage data is not available for Canadice or Hemlock Lake.

The flood situation on Conesus Lake became particularly acute when controversy arose as to whether or not three gated culverts through a small dam at the Lake outlet should be opened or the dam removed to alleviate flooding on Conesus Lake. The Town of Avon, located downstream of the dam, objected to the opening of the culverts or removal of the dam because conditions at Avon would become worse. At a meeting held in Geneseo on 25 June 1972, town officials conferring with Buffalo District personnel decided that, since the channel downstream of the Lake was the control rather than the dam

at the Lake outlet, opening of the culverts or removal of the dam would not have any effect on lowering of the Lake level. Public pressure and emotion eventually outweighed engineering judgement and the culverts were opened. The result was that no increase in flows downstream were noted, indicating that opening the dam did not improve the situation on the Lake. Figure 23 shows flooding conditions on Conesus Lake.

Figure 23 Flooding along West Lake Road at Conesus Lake.

CANASERAGA CREEK

Canaseraga Creek is the largest tributary of the Genesee River with a drainage area of 335 square miles at the mouth. It is located in the lower Genesee River Basin and joins the Genesee River about four miles below Mount Morris Lake.

There is at present one water stage recorder operated by the U.S. Geological Survey on Canaseraga Creek and it is located at Dansville. It remained in operation during the June 1972 flood. The magnitude of the June 1972 flood at this location was estimated to be a 125-year event.

The Canaseraga Valley, particularly downstream of Dansville, NY, has long been the target of flooding. However, this usually occurs during the spring of the year before crop planting, and is primarily due to snow melt augmented by rainfall. The June 1972 flood occurred at a very inopportune time in that for most of the farmers it was after the second planting of the season. The first planting had virtually been wiped out by a frost that settled in the area on 9-10 June.

In Dansville, Canaseraga Creek and Mud Creek forced approximately 110 persons from their homes. Trailer courts near Poags Hole Road were severely damaged.

In the Mount Morris area, water from Canaseraga Creek and the Genesee River caused the evacuation of approximately 125 persons and caused extensive damage to homes and businesses in the area. A new sewage treatment plant just off State Route 409 which was just under construction incurred approximately $111,000 damage.

The outflow from Canaseraga Creek is affected by the releases made from Mount Morris Dam. When large releases are made, the outflow from Canaseraga Creek is retarded. Under ordinary circumstances, Mount Morris Dam is operated to hold back the water on the Genesee River, allowing Canaseraga Creek to drain faster than normal, thereby, affording a limited amount of flood relief to the Canaseraga Valley. While effects on the Canaseraga Valley were not as great as they would have been if Mount Morris Dam had not been in place during the June 1972 flood, there was some retardation of flow out of Canaseraga Creek which was caused by the large releases from Mount Morris Lake. Thus, this was the first time that Mount Morris Dam was not able to afford 100 percent effort to try and alleviate flooding on Canaseraga Creek. It is estimated, however, that Mount Morris Dam prevented approximately $4,710,000 damage to the lower Canaseraga Creek basin.

Figures 24 through 28 show June 1972 flood conditions on Canaseraga Creek.

The area inundated by the June 1972 flood is shown on Plates 21 and 22. A water surface profile of this flood is shown on Plates 23 and 24.

Total estimated June 1972 flood damage is given in Table 13.

Table 13 - Total Estimated June 1972 Flood Damages on Canaseraga Creek.

Damage Reach	Total Estimated June 1972 Flood Damages				
	Residential	Commercial	Agricultural (1)	Public and Other	Total
	$	$	$	$	$
C-1	10,000	6,000	154,000	137,000	307,000
C-2	(2)	(2)	96,000	1,000	97,000
C-3	(2)	(2)	49,000	-	49,000
C-4	(2)	(2)	57,000	173,000	230,000
C-5	(2)	(2)	223,000	76,000	299,000
C-6	(2)	(2)	189,000	7,000	196,000
C-7	(2)	(2)	93,000	7,000	100,000
C-8	(2)	(2)	916,000	20,000	936,000
TOTAL	10,000	6,000	1,777,000	421,000	2,214,000

(1) Information furnished by U.S. Department of Agriculture, Soil Conservation Service.
(2) Area is primarily agricultural.

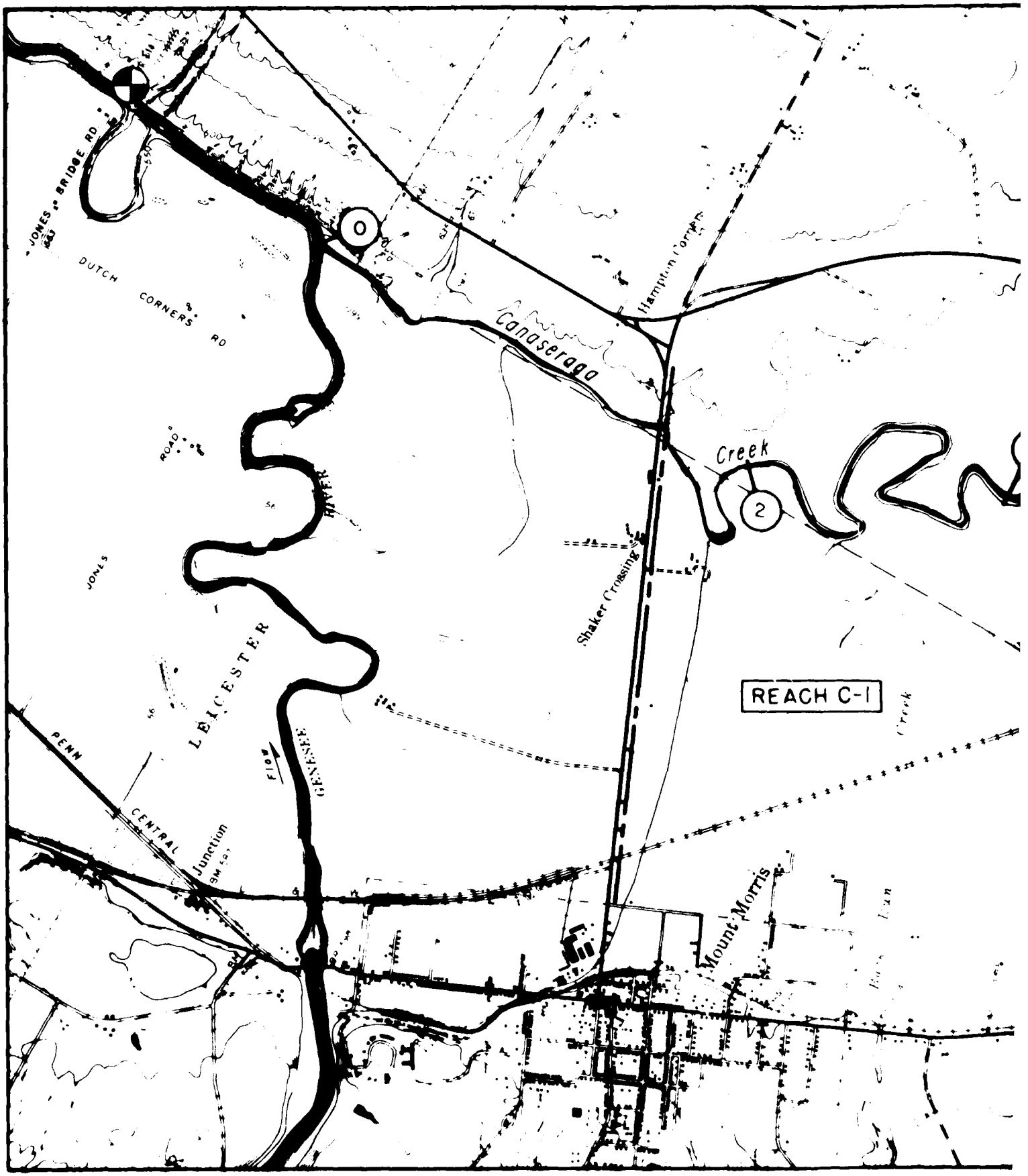
Figure 24 Looking east along State Route 408 at flooding in the Village of Mount Morris. Photo taken 23 June 1972.

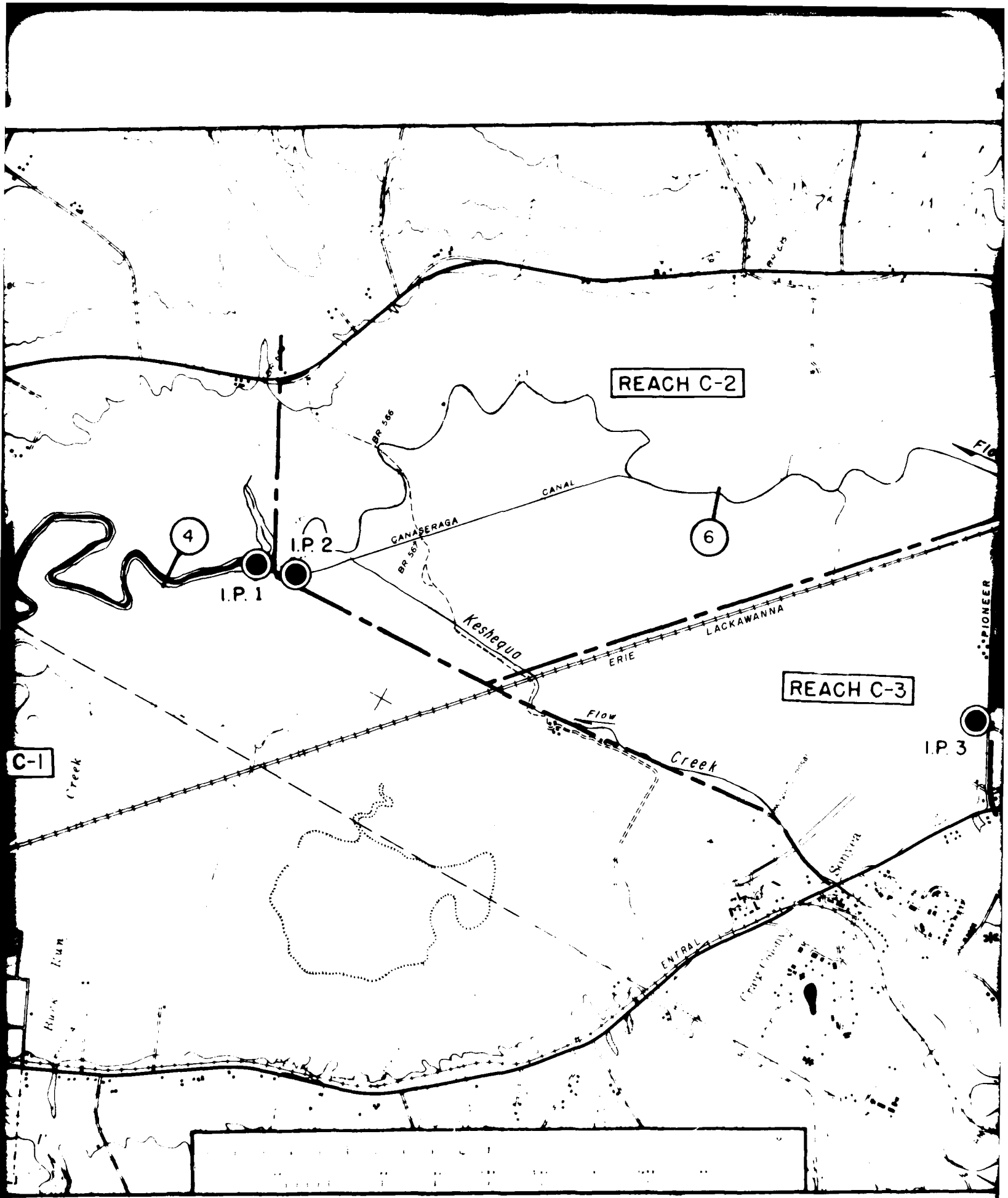
Figure 25 Looking east along State Route 258 at flooding in Groveland flats area near creek mile 10. Photo taken 22 June 1972.

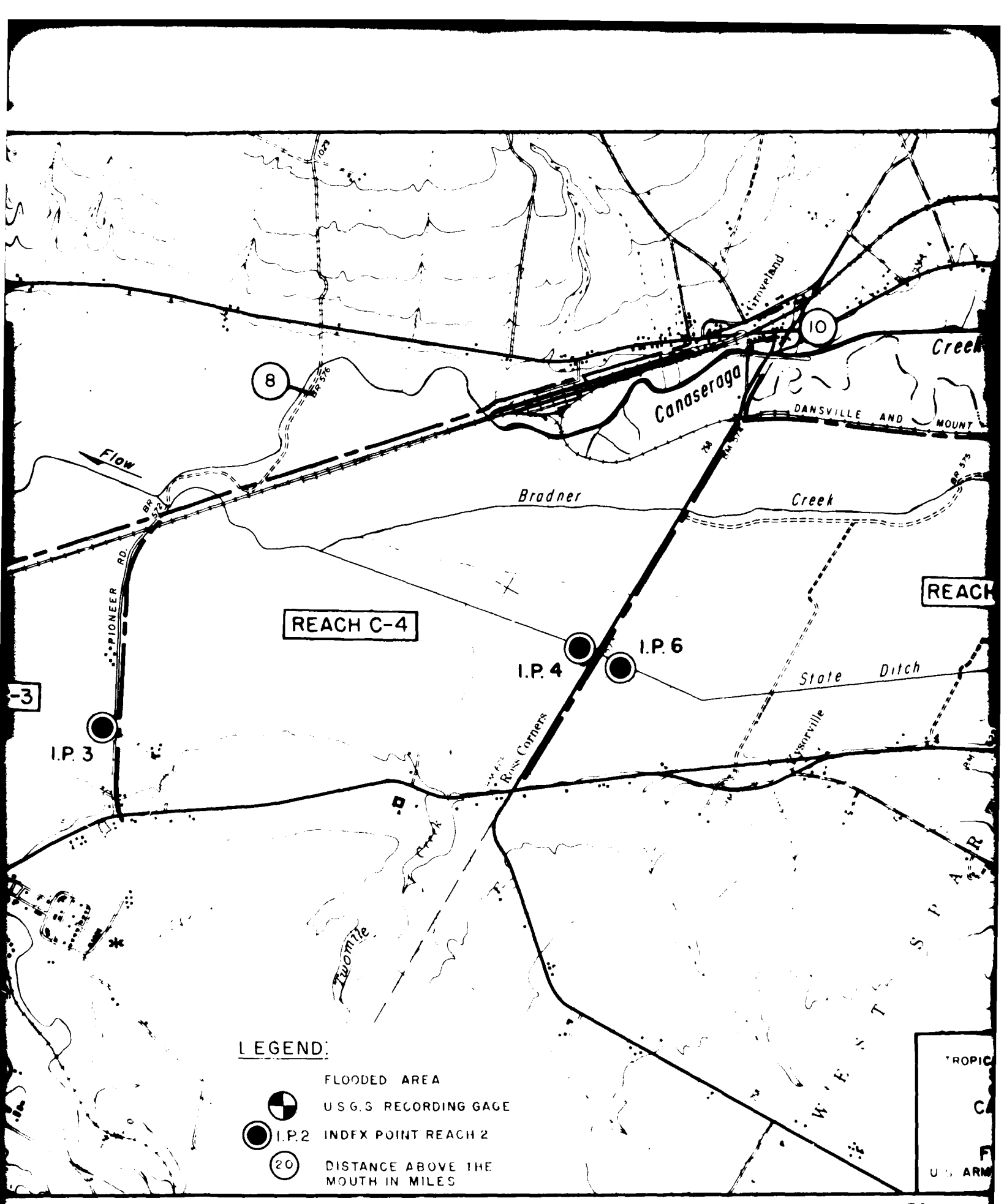
Fig. 26

Figure 27 Everman Road near Bradner Creek looking east.

Figure 28 Applinville Road looking north.


JONES BRIDGE RD
DUTCH CORNERS RD
ROAD
JONES
LEICESTER
PENN CENTRAL
Junction
GENESEE
Canaseraga
Hampton Corners
Creek
Shaker Crossing
Mount Morris
REACH C-1
0
2


REACH C-2
REACH C-3
I.P. 1
I.P. 2
I.P. 3
4
6
C-1
BR 566
BR 567
CANASERAGA
CANAL
Keshequa
ERIE
LACKAWANNA
PIONEER
Flow
Creek
Run
ENTRAL


Groveland
10
Creek
8
Canaseraga
DANSVILLE AND MOUNT
Flow
Bradner
Creek
PIONEER RD.
REACH C-4
REACH
I.P. 6
I.P. 4
State Ditch
I.P. 3
Ross Corners
Dyersville
Twomile
LEGEND:
FLOODED AREA
U.S.G.S RECORDING GAGE
I.P.2 INDEX POINT REACH 2
20 DISTANCE ABOVE THE MOUTH IN MILES

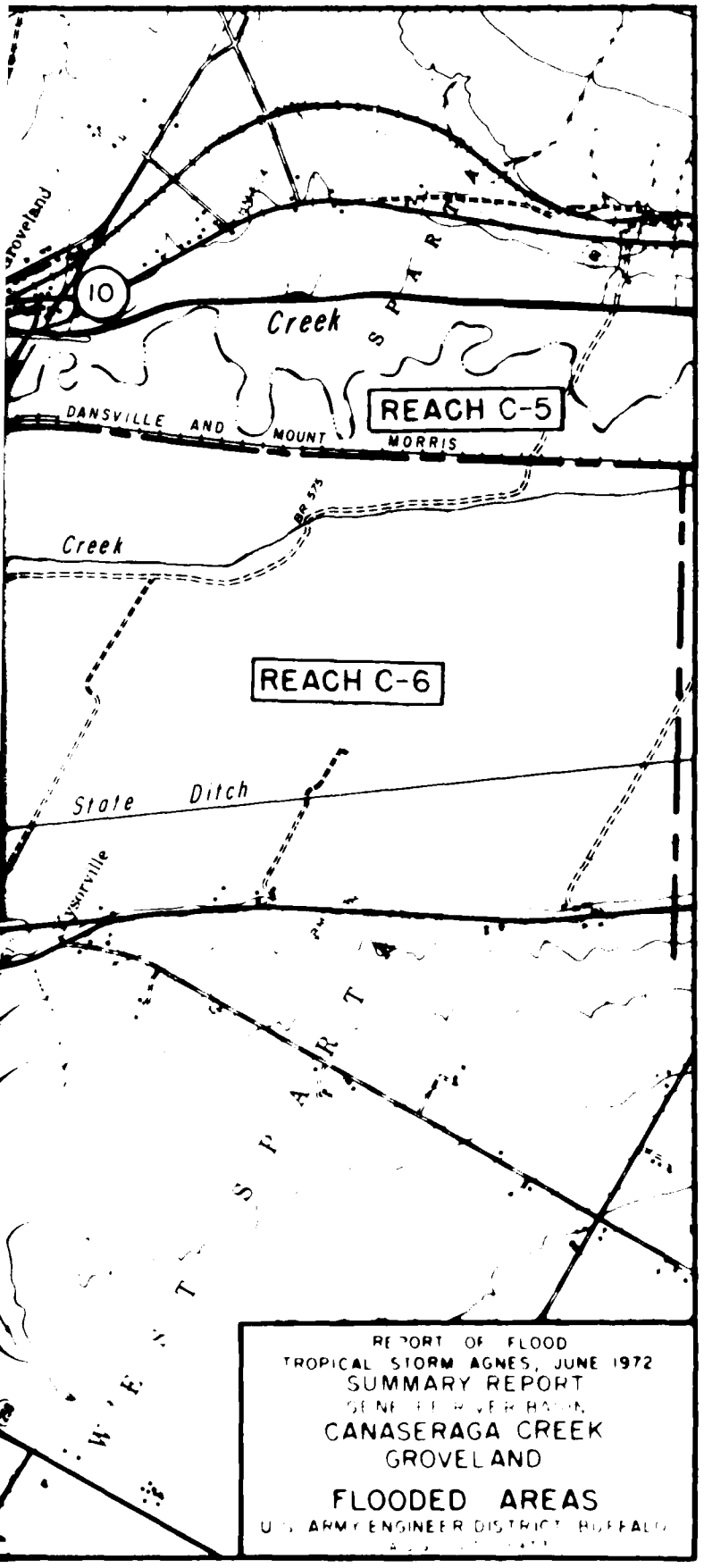
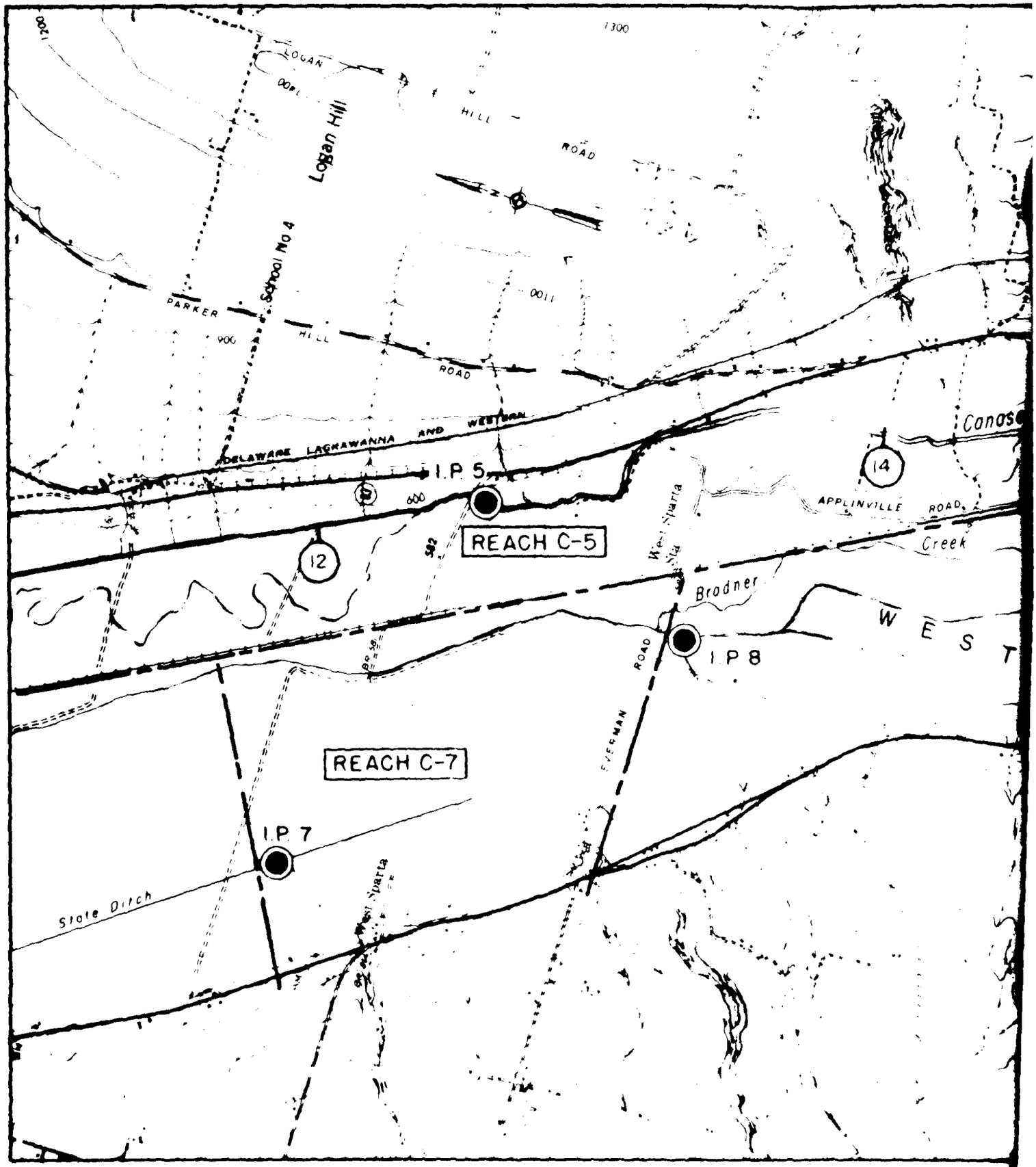
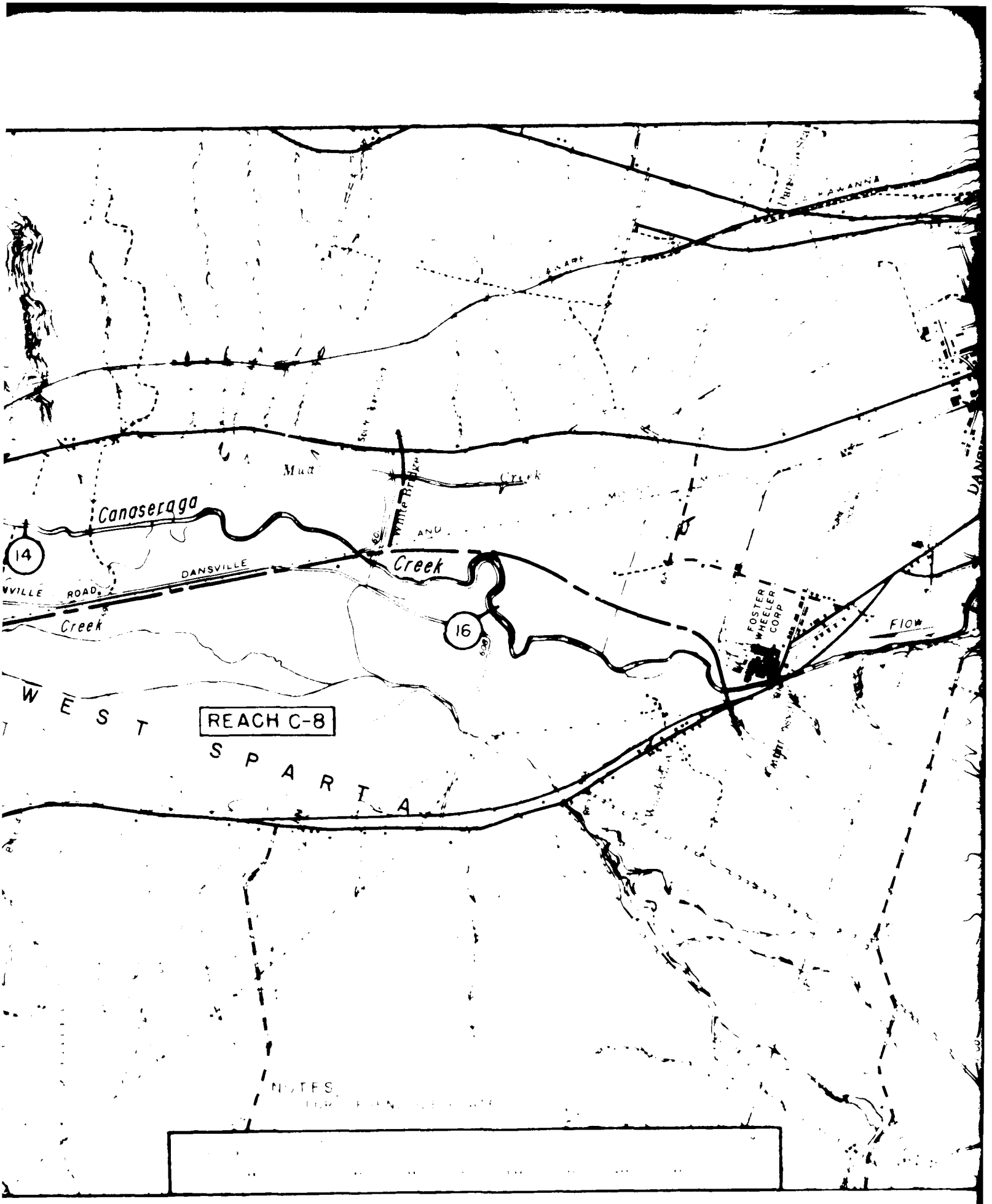
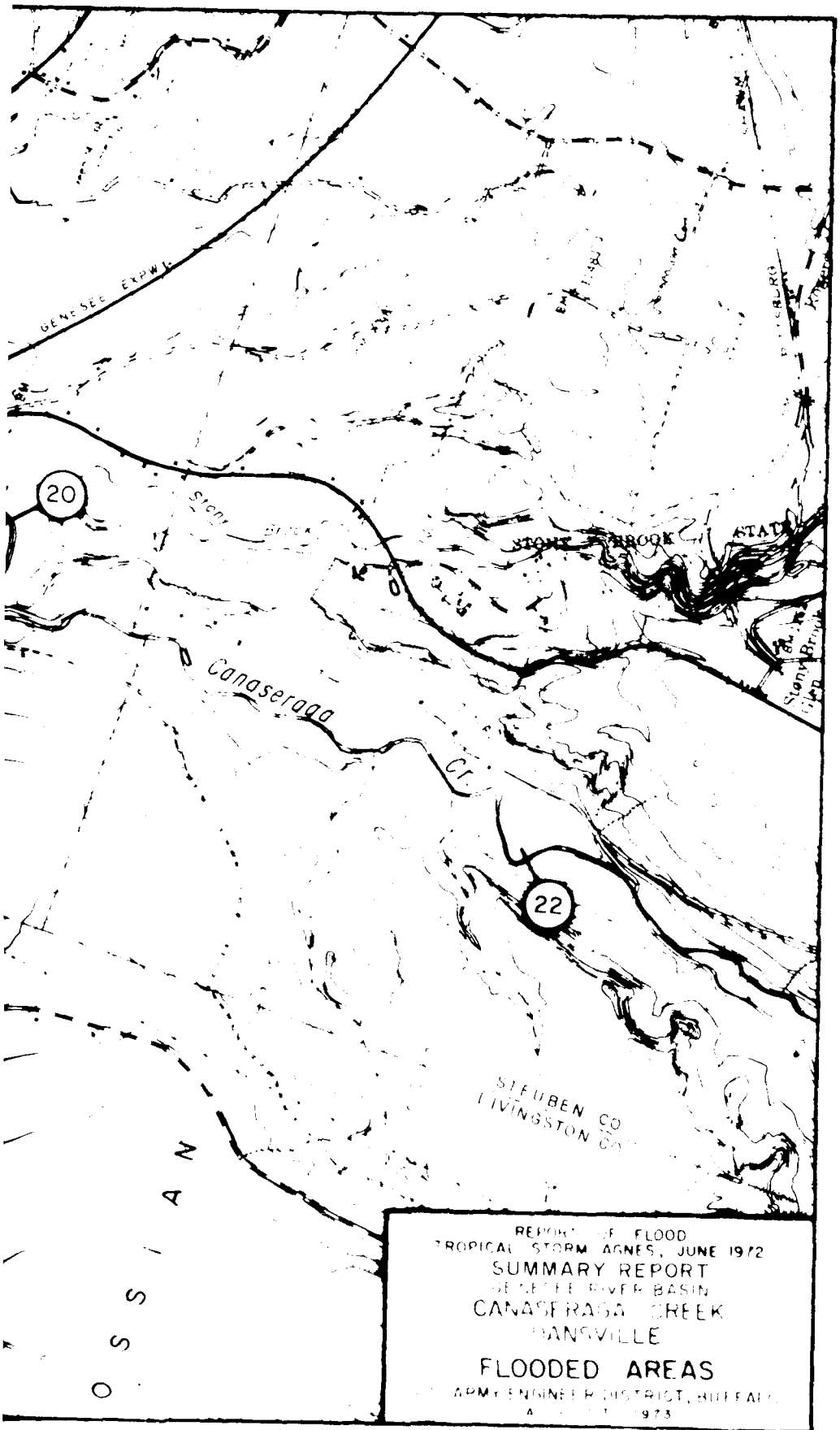

Groveland
10
Creek
SPAR
REACH C-5
DANSVILLE AND MOUNT MORRIS
Creek
REACH C-6
State Ditch
Sparrow
WEST SPARROW
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
GENESEE RIVER BASIN
CANASERAGA CREEK
GROVELAND
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 21


LOGAN
HILL
ROAD
Logan Hill
School No 4
PARKER
HILL
ROAD
DELAWARE LACKAWANNA AND WESTERN
I.P 5
REACH C-5
APPLINVILLE ROAD
Creek
Brodner
WEST
I P 8
REACH C-7
I.P 7
State Ditch
12
14

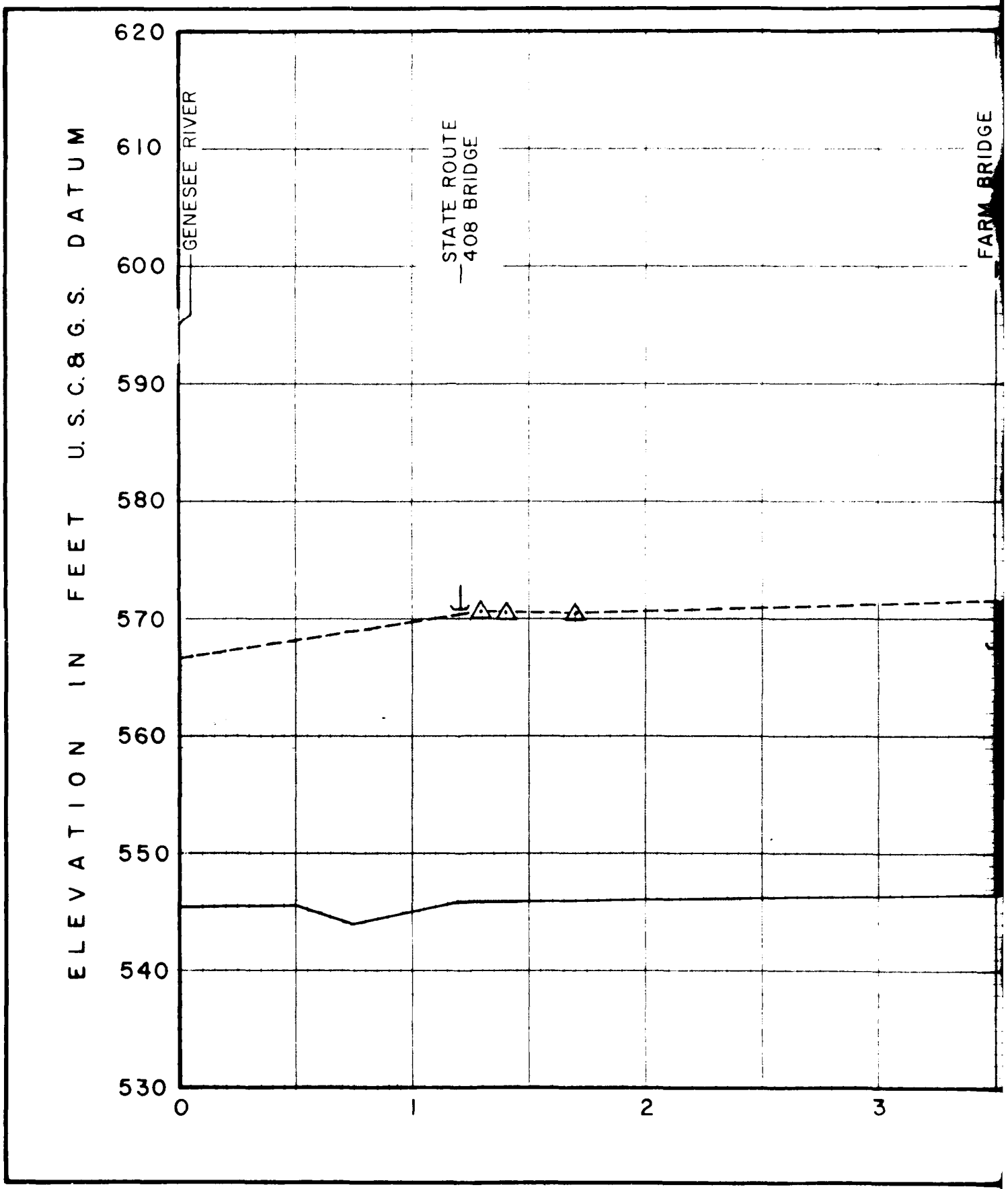

Canaseraga
Creek
Mud
Creek
DANSVILLE
ROAD
Creek
14
16
FOSTER WHEELER CORP
FLOW
WEST SPARTA
REACH C-8
NOTES

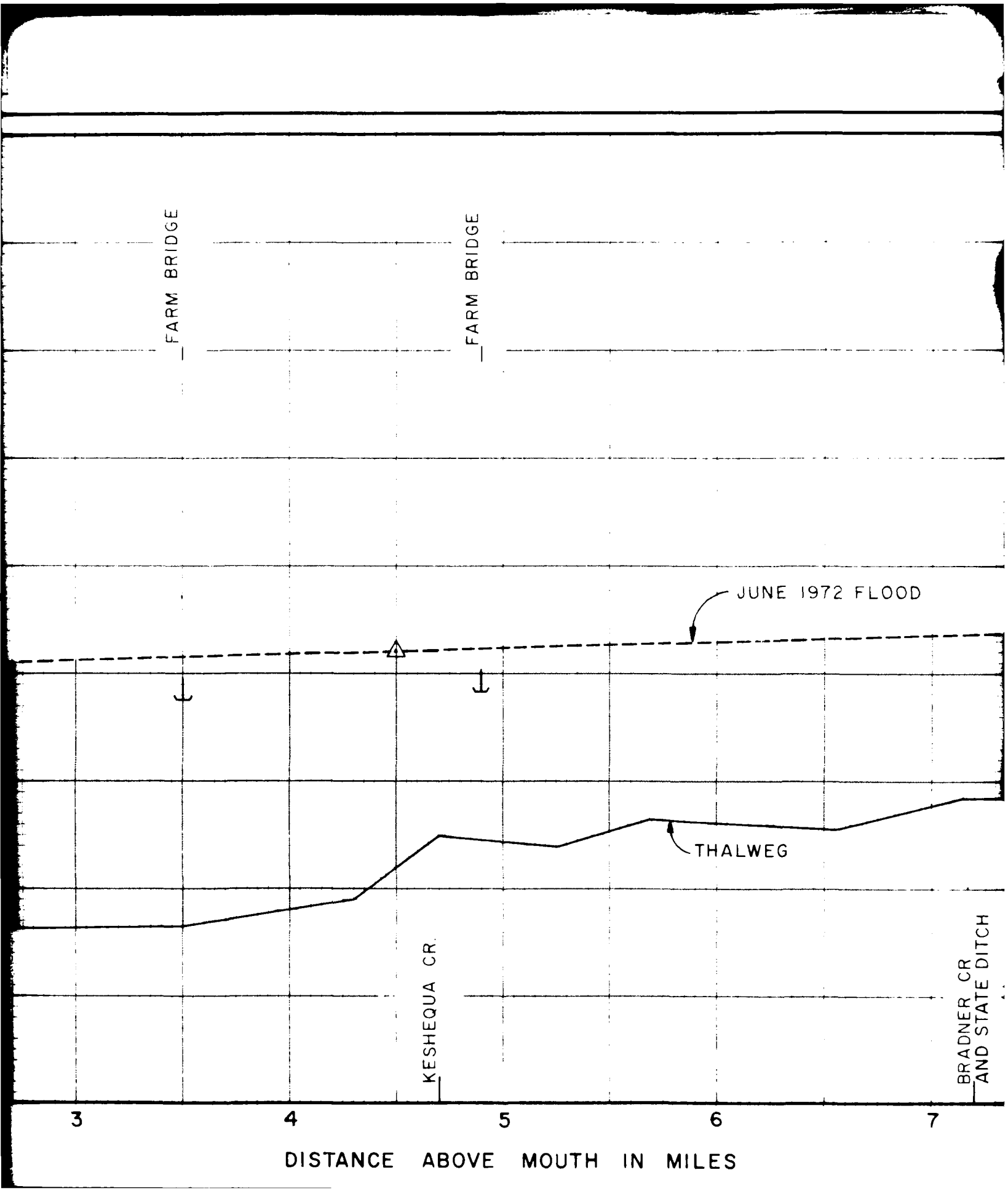
DANSVILLE
GENESEE EXPWY
20
18
FLOW
Canaseraga
OSSIAN

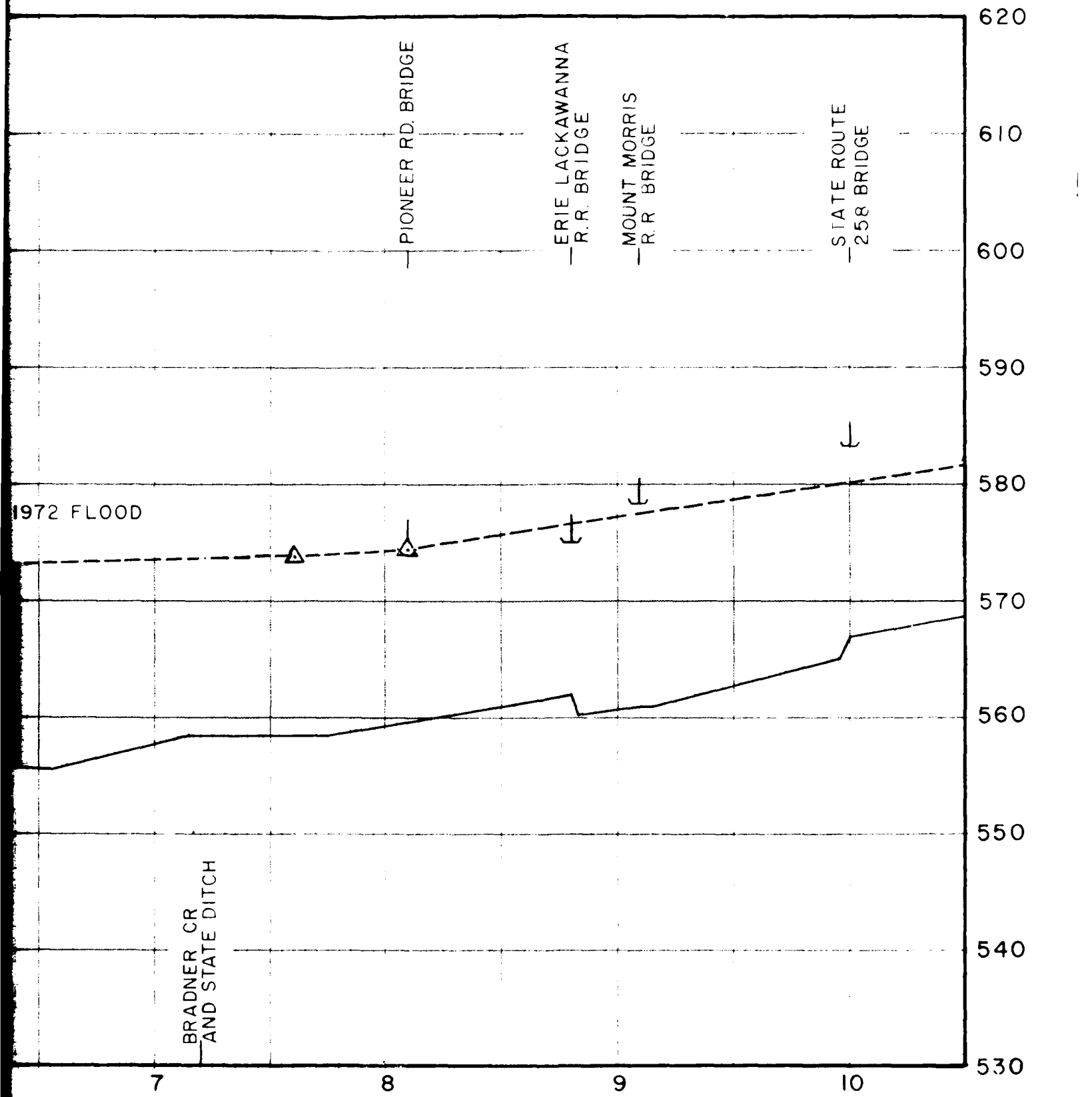


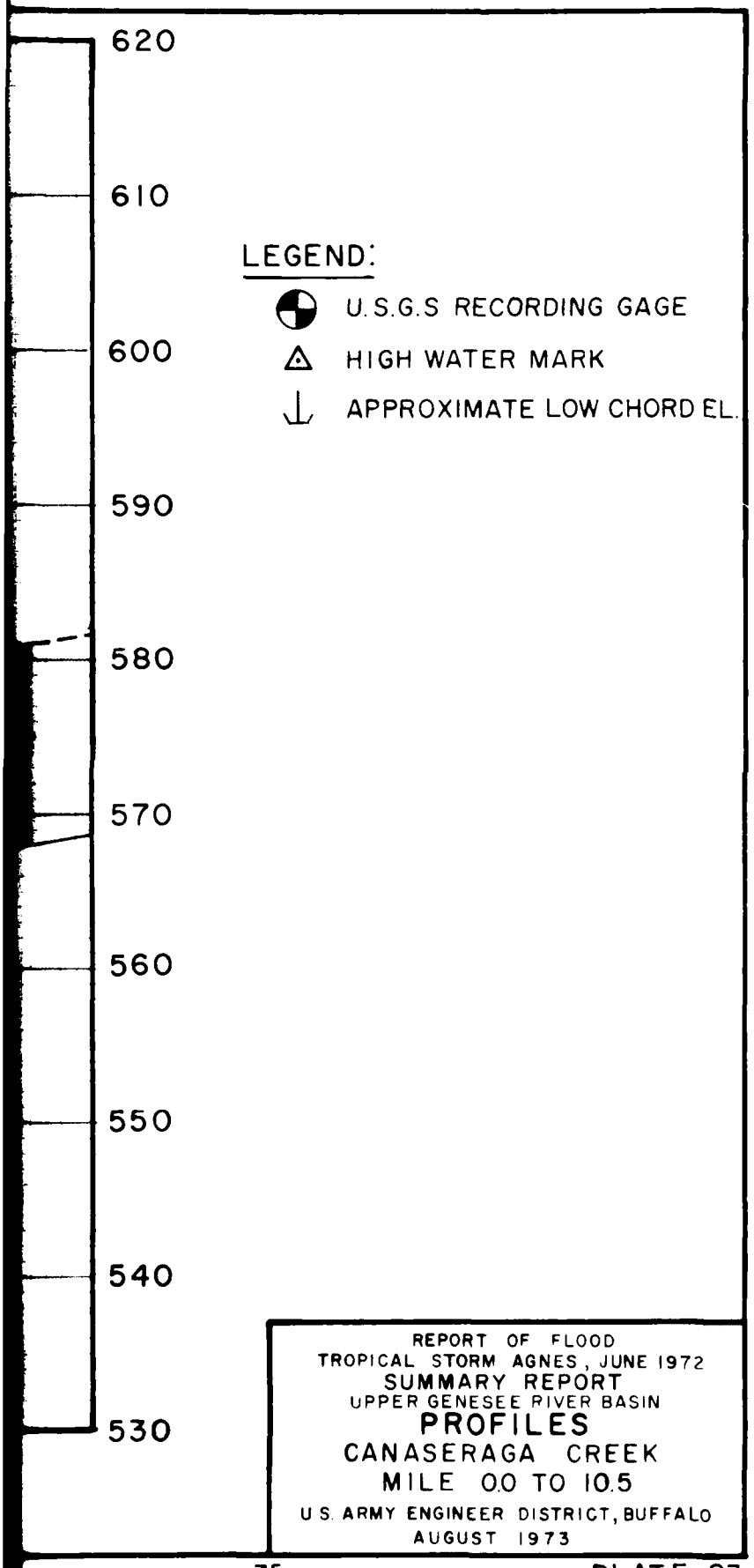
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
GENESEE RIVER BASIN
CANASERAGA CREEK
DANSVILLE
FLOODED AREAS
ARMY ENGINEER DISTRICT, BUFFALO
A[illegible] 1973

PLATE 22


ELEVATION IN FEET U.S.C.&G.S. DATUM
620
610
600
590
580
570
560
550
540
530
0
1
2
3
GENESEE RIVER
STATE ROUTE
408 BRIDGE
FARM BRIDGE


FARM BRIDGE
FARM BRIDGE
JUNE 1972 FLOOD
THALWEG
KESHEQUA CR.
BRADNER CR
AND STATE DITCH
3
4
5
6
7
DISTANCE ABOVE MOUTH IN MILES


620
610
600
590
580
570
560
550
540
530
PIONEER RD. BRIDGE
ERIE LACKAWANNA R.R. BRIDGE
MOUNT MORRIS R.R. BRIDGE
STATE ROUTE 258 BRIDGE
1972 FLOOD
BRADNER CR AND STATE DITCH
7
8
9
10



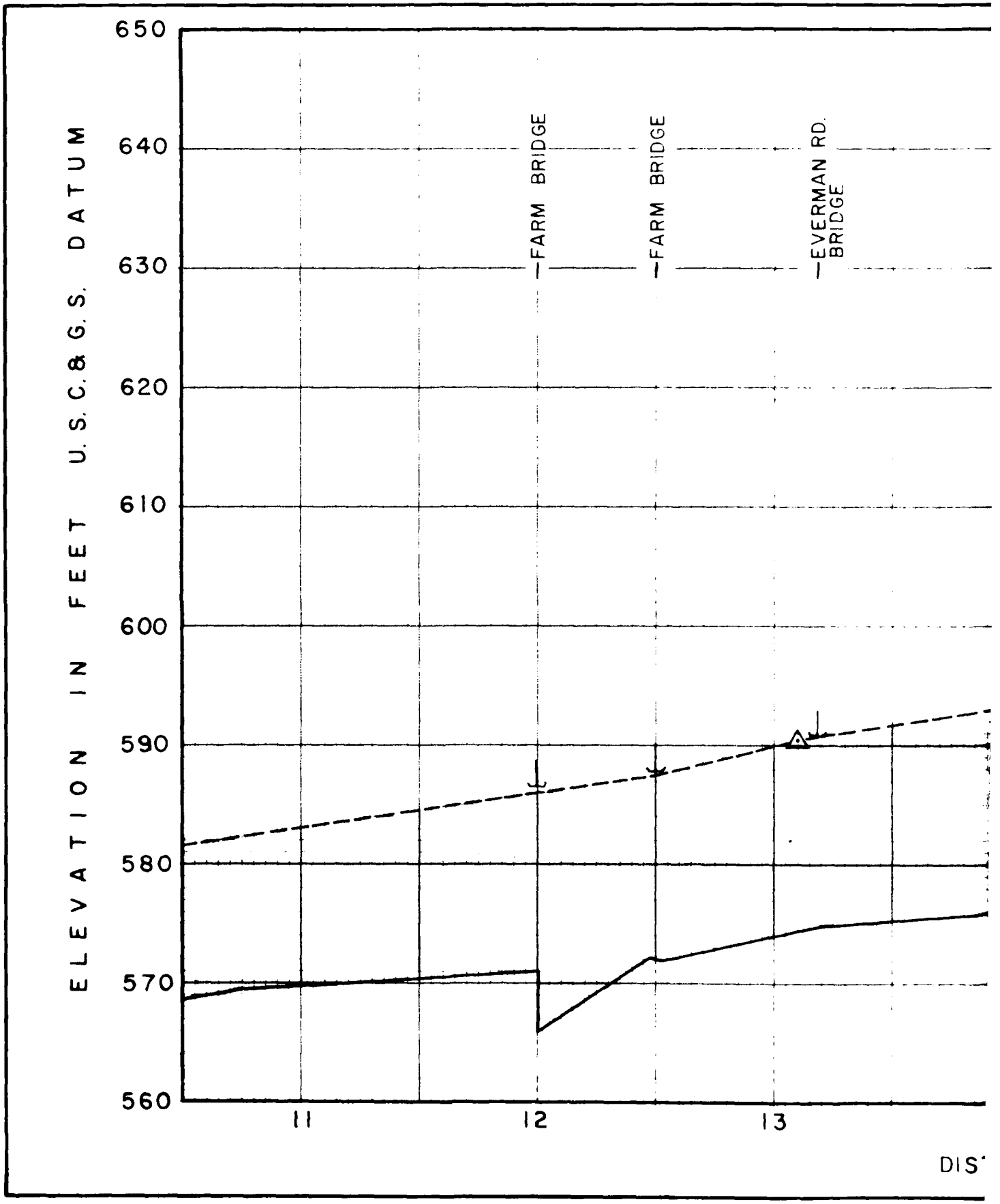
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN

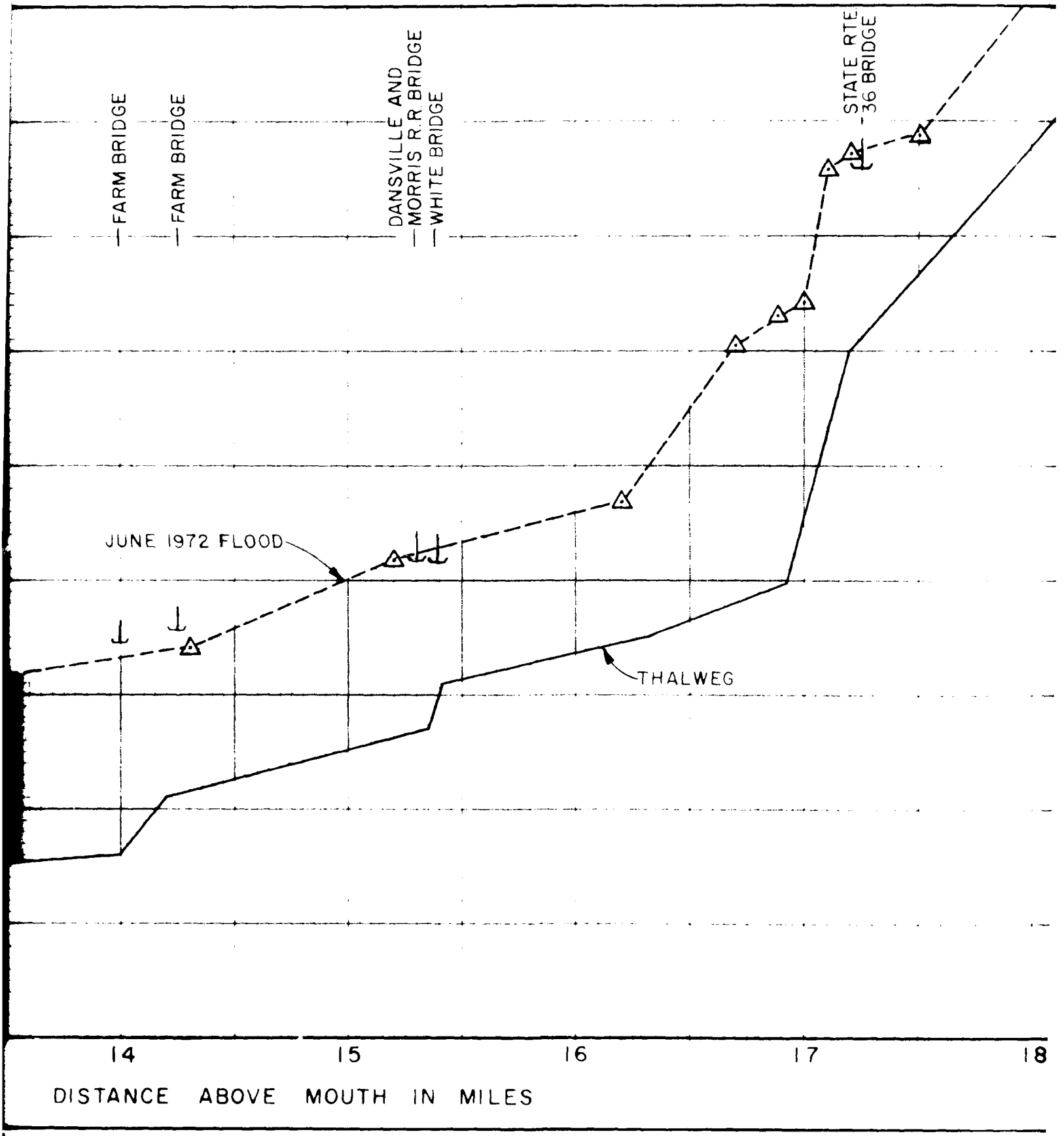
PROFILES

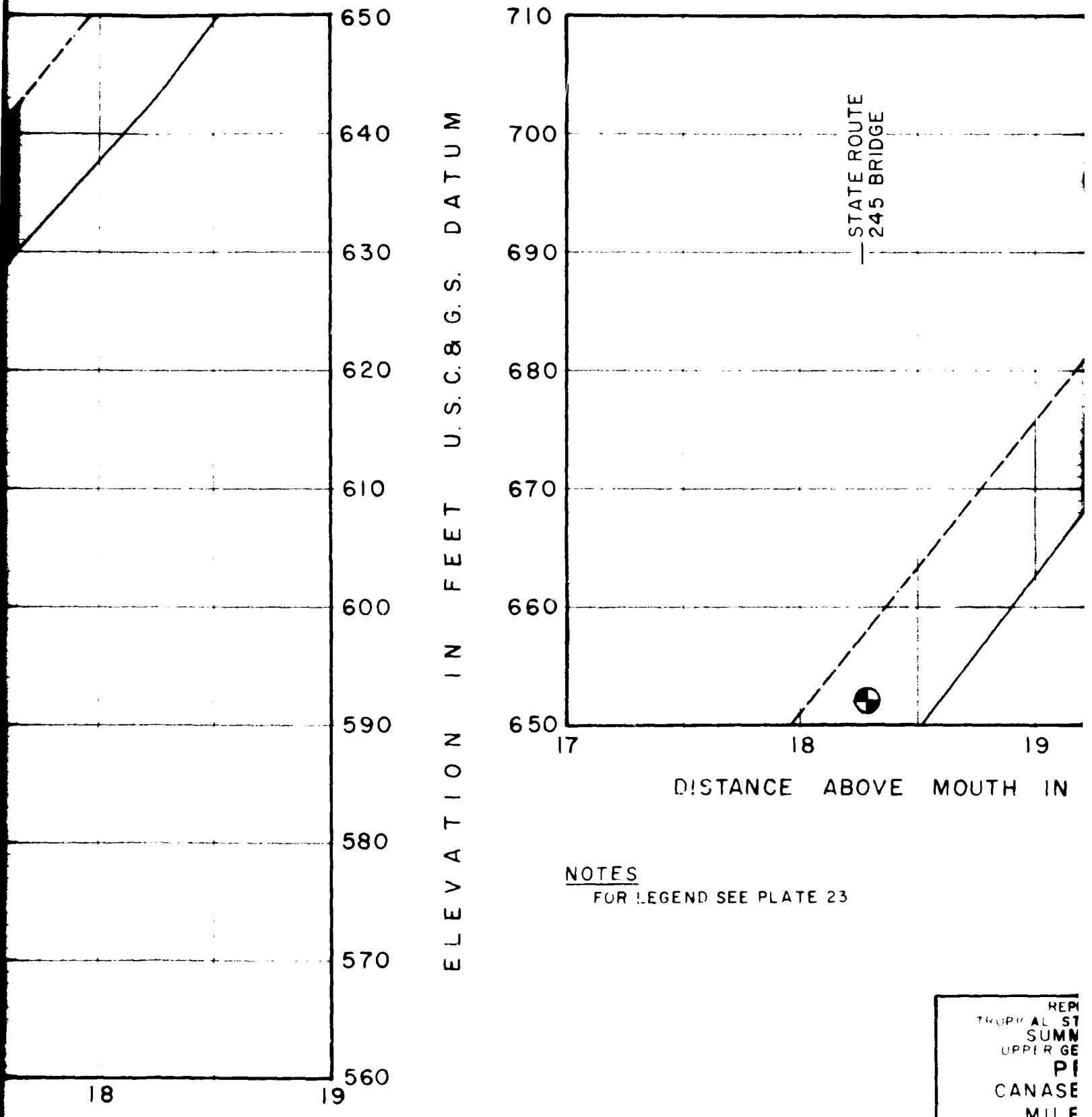
CANASERAGA CREEK
MILE 0.0 TO 10.5

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 23


ELEVATION IN FEET U.S.C.&G.S. DATUM
650
640
630
620
610
600
590
580
570
560
FARM BRIDGE
FARM BRIDGE
EVERMAN RD. BRIDGE
11
12
13
DIS


FARM BRIDGE
FARM BRIDGE
DANSVILLE AND
MORRIS R.R. BRIDGE
WHITE BRIDGE
STATE RTE
-36 BRIDGE
JUNE 1972 FLOOD
THALWEG
14
15
16
17
18
DISTANCE ABOVE MOUTH IN MILES



NOTES

FOR LEGEND SEE PLATE 23

REP
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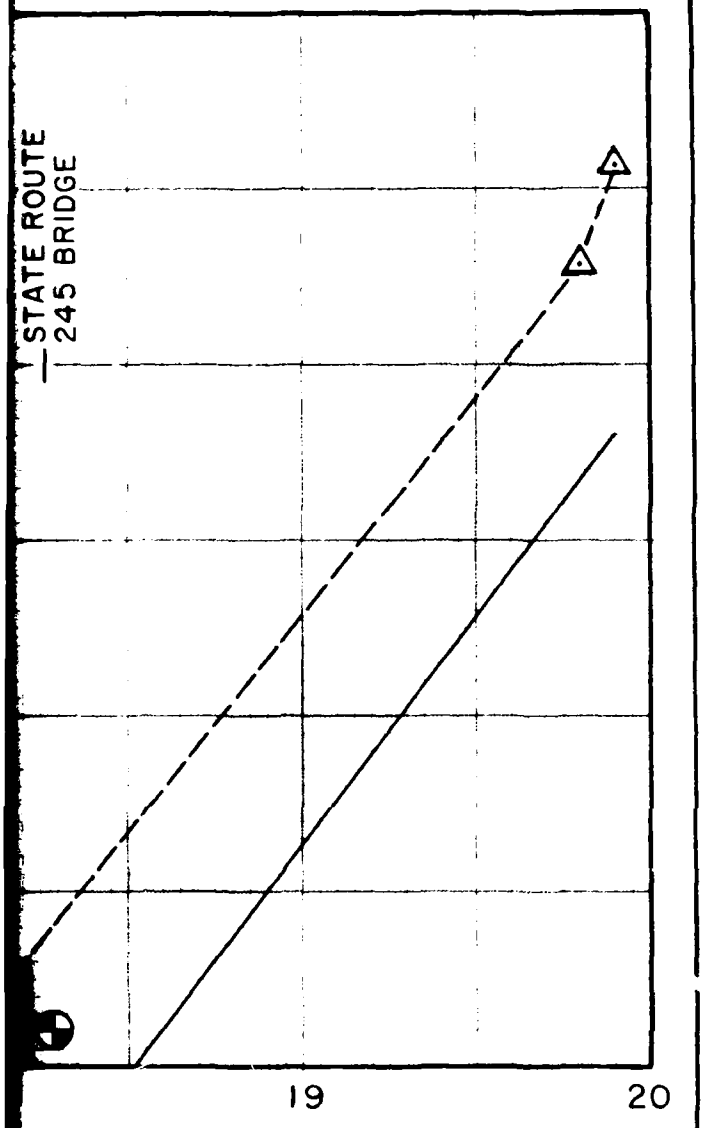


OVE MOUTH IN MILES

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
UPPER GENESEE RIVER BASIN
PROFILES
CANASERAGA CREEK
MILE 10.5 TO 19.9
U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 24

OPERATION OF MOUNT MORRIS DAM

There were two major objectives in controlling the operation of Mount Morris Dam during the June 1972 flood. They were to avoid spillway overflow, if possible, and schedule reservoir outflows so as to minimize the effect on downstream areas. The avoidance of spillway overflow is a normal objective, but in this situation, a large quantity of floating debris upstream of the structure made it even more critical. The release of this debris over the spillway would have caused destruction of bridges and roads and resulting debris dams would have caused increased stages and additional flooding in the downstream areas.

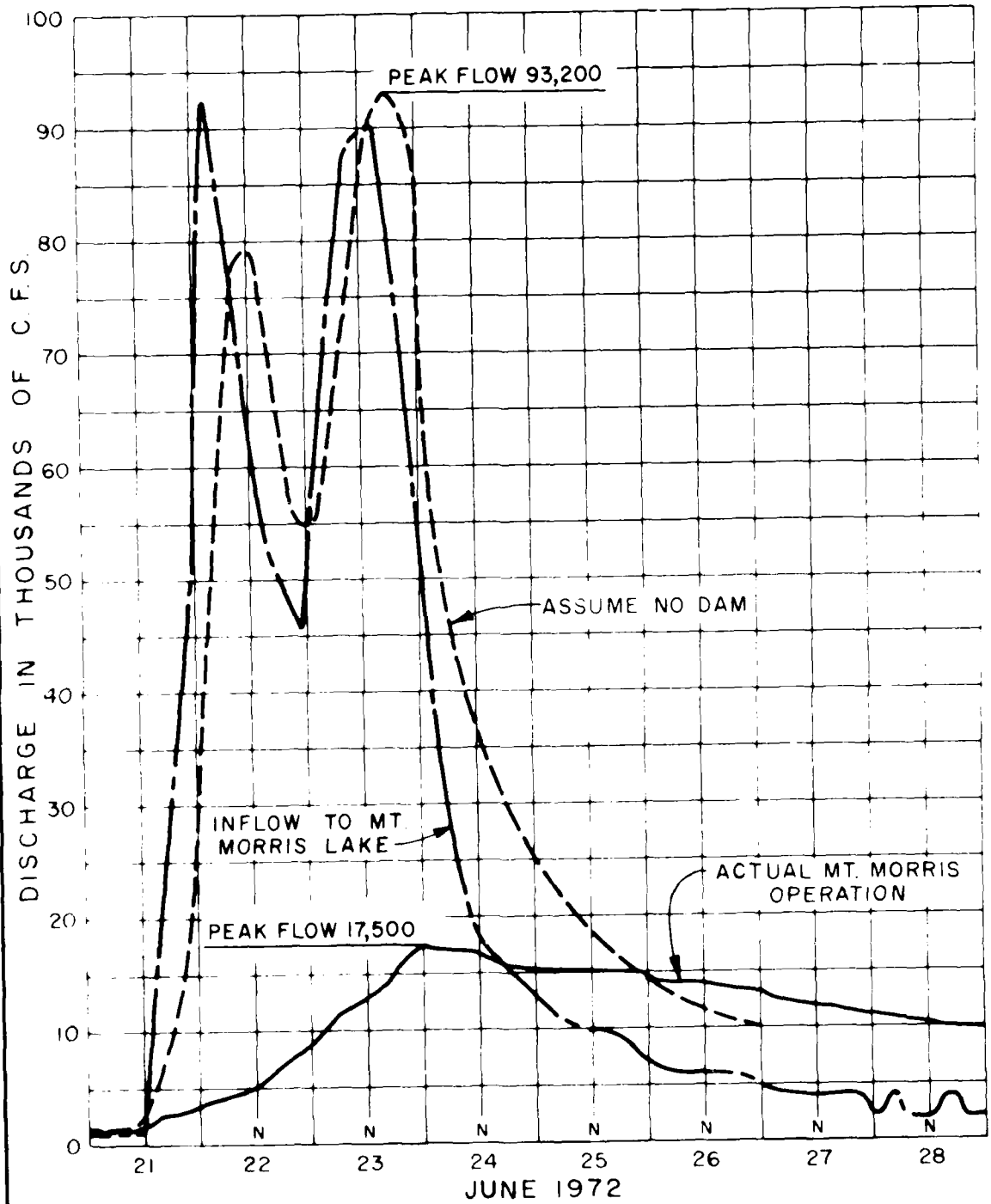
Since upstream river gages at Portageville and Scio were washed out, inflow data had to be derived from other less reliable means. From the available and indicated rainfall data and monitored reservoir elevations, it could be seen that the spillway would be overtopped unless outflows were increased. After adequate warning was given to downstream areas, outflows were increased to keep Mount Morris Dam from being overtopped.

As a result of the operation, the peak stage was 4.2 feet below the spillway crest and no debris was spilled. A maximum outflow of 15,000 cfs was held for 4 hours. It is estimated that this peak discharge raised the river level about one foot at Avon, where levels reached about 7 feet above flood stage. A total of $2,866,000 in damages are estimated along the lower Genesee River and the benefits from the operation of Mount Morris Dam were estimated at $210,000,000. Estimates made after the flood indicate that water levels below the dam would have been approximately 10 to 15 feet higher than they were had Mt. Morris Dam not been constructed. A comparison of actual discharges with those that would have occurred at the Jones Bridge, Avon, and Rochester gage sites, is shown on Plates 25 through 27, respectively.

After the flood, operation of the dam was examined to see whether better results downstream could have been achieved under different operating procedures. Three alternative procedures were evaluated. Plate 28 shows that each of the alternative schemes considered would have resulted in overtopping, which violates the criteria decided upon at the onset of dam operation. Also shown on this Plate is the actual Mount Morris Dam operation. Plate 29 shows pertinent data for the operation of Mount Morris Dam from 21 June to 5 July 1972.

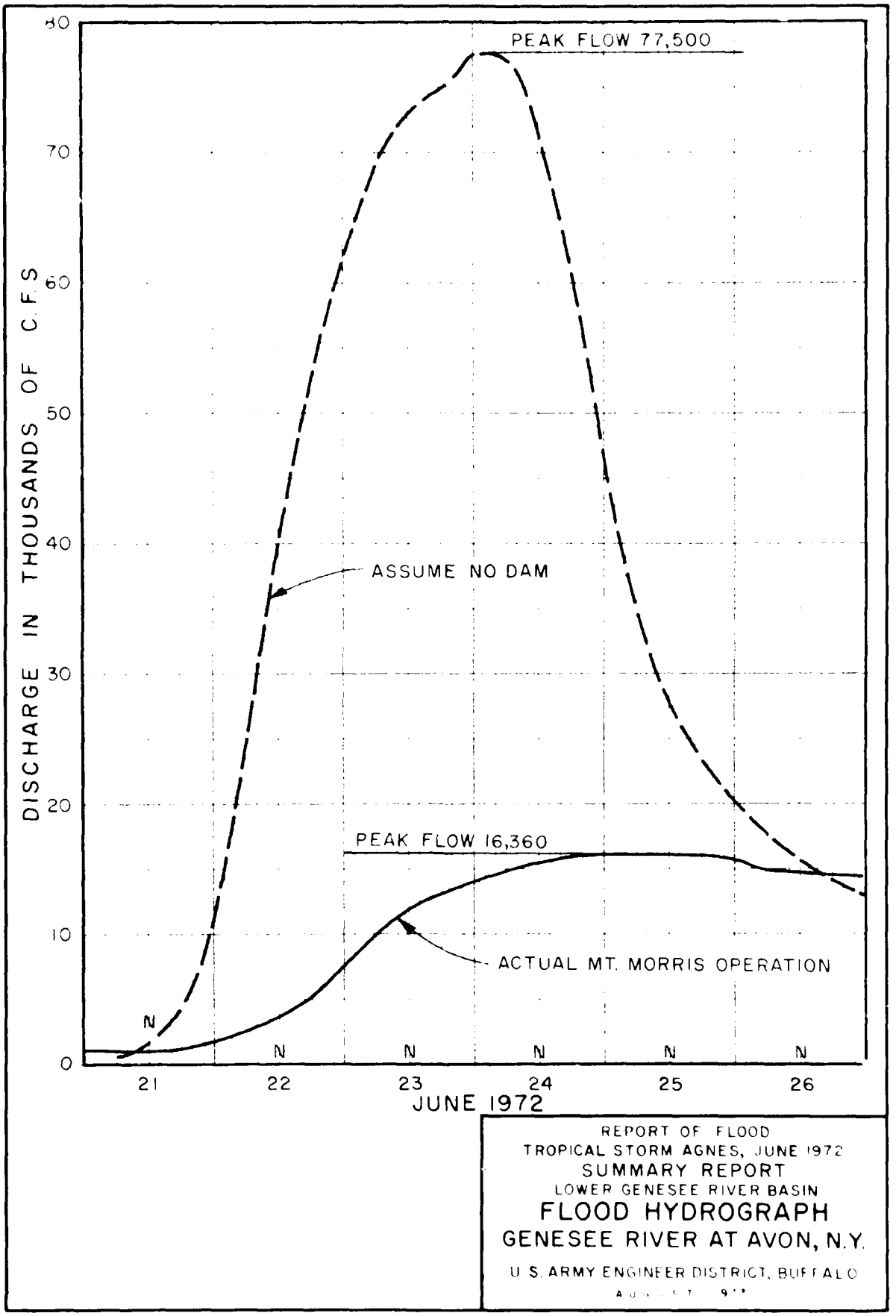
The question of whether or not the "most desireable" results were achieved is philosophical. In light of objectives set forth, and information available at the time, operation of the dam was a success.

Plate 30 shows the limits of the maximum pool area which was approximated by the June 1972 flood.



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN
FLOOD HYDROGRAPH
GENESEE R. AT JONES BR., N.Y.
U. S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 25

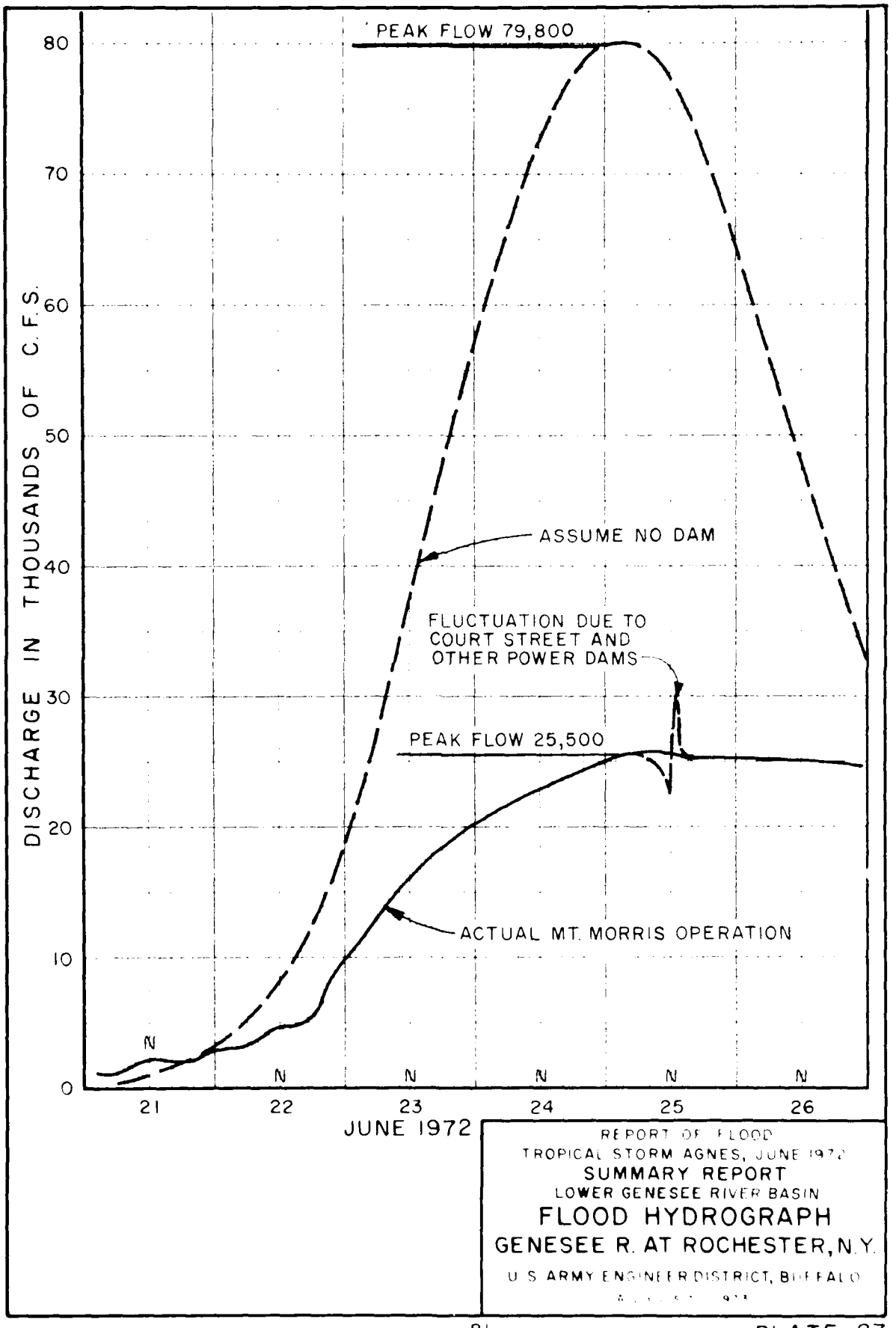


REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN

FLOOD HYDROGRAPH
GENESEE RIVER AT AVON, N.Y.

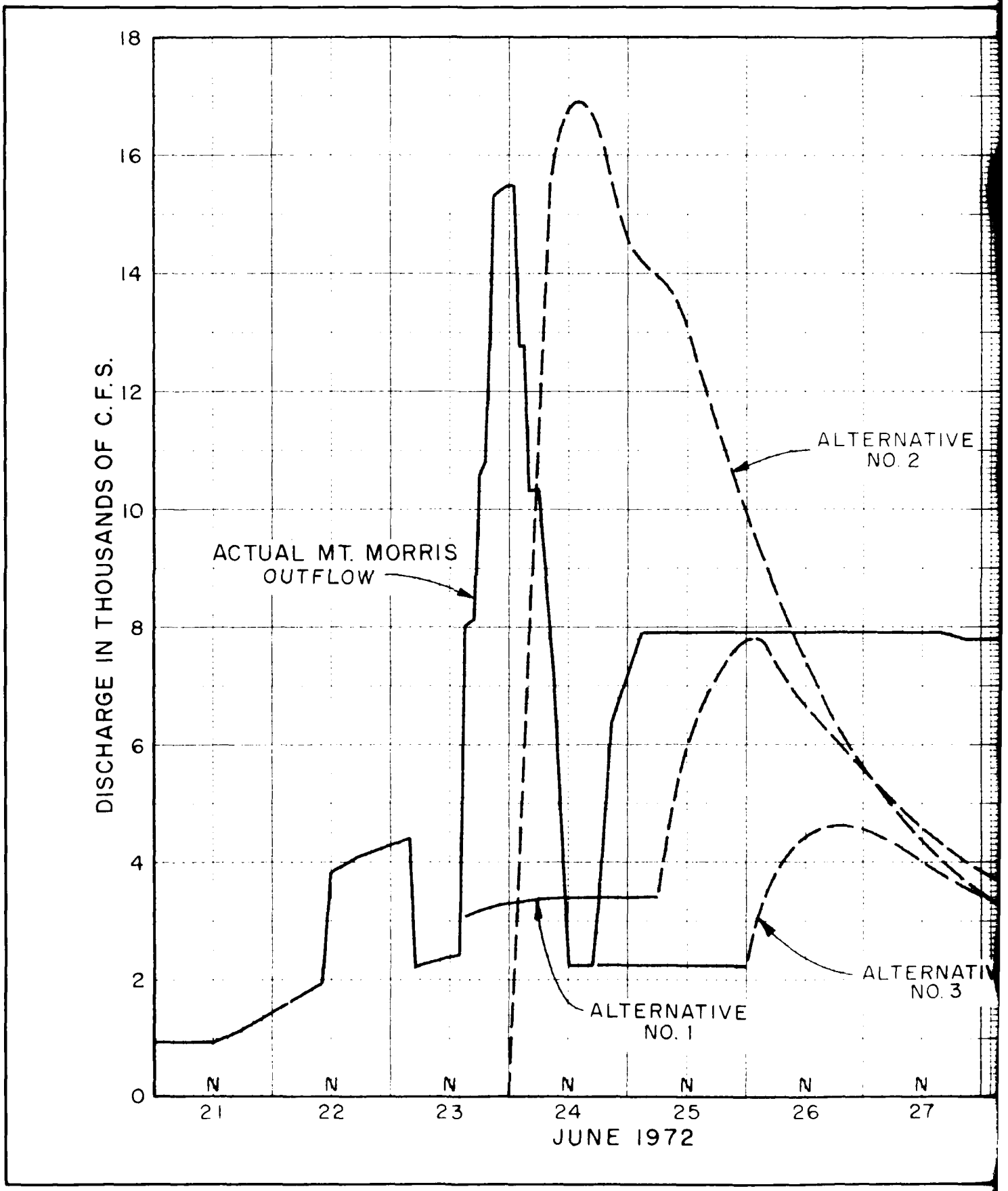
U. S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 9**

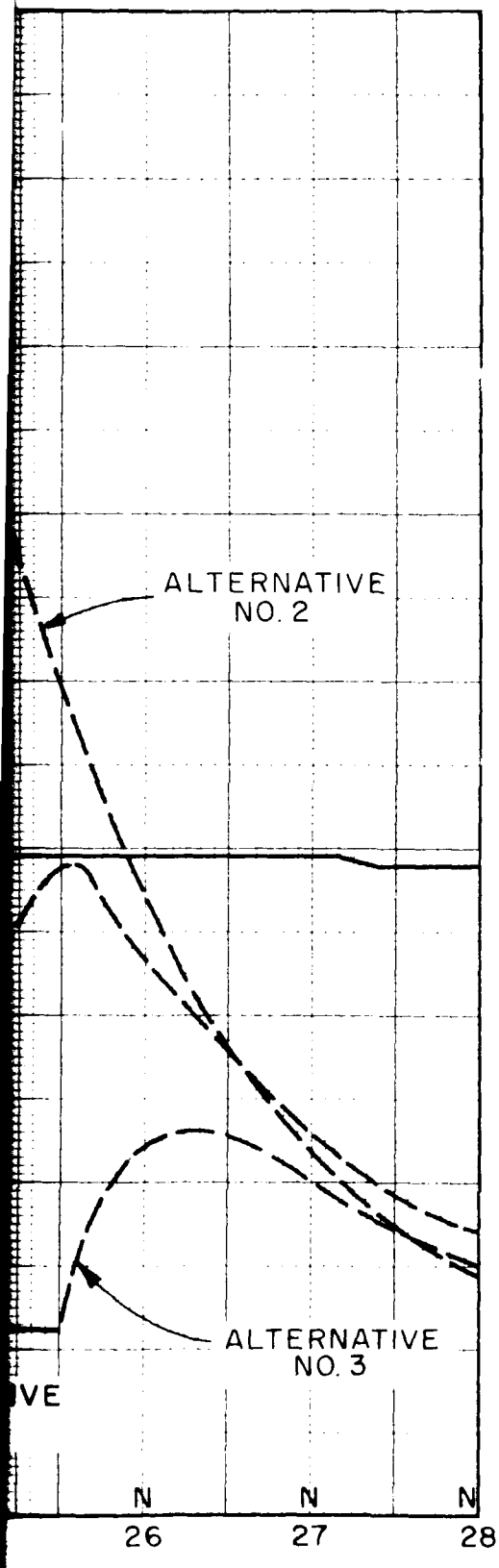
PLATE 26



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN
FLOOD HYDROGRAPH
GENESEE R. AT ROCHESTER, N.Y.
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 27


DISCHARGE IN THOUSANDS OF C.F.S.
18
16
14
12
10
8
6
4
2
0
ACTUAL MT. MORRIS
OUTFLOW
ALTERNATIVE
NO. 2
ALTERNATIVE
NO. 1
ALTERNATI
NO. 3
N
21
22
23
24
25
26
27
JUNE 1972



LEGEND:

ALTERNATIVE NO. 1 - MAINTAIN 9 GATES OPEN 1 FT. FROM 1200 HOURS, 23 JUNE.

RESULTS: OVERTOP SPILLWAY AT 0600 HOURS ON 25 JUNE. MAXIMUM RELEASE = 7800 C.F.S. OF WATER PLUS DEBRIS.

ALTERNATIVE NO. 2 - RELEASE NO WATER AFTER 0800 HOURS 20 JUNE.

RESULTS: SPILLWAY WOULD BE OVERTOPPED AT 0200 HOURS 24 JUNE, PEAKING AT 1400 HOURS WITH A MAXIMUM Q = 16,900 C.F.S. PLUS. DEBRIS.

ALTERNATIVE NO. 3 - FROM 1600 HOURS 24 JUNE MAINTAIN A CONSTANT OUTFLOW OF 2200 C.F.S.

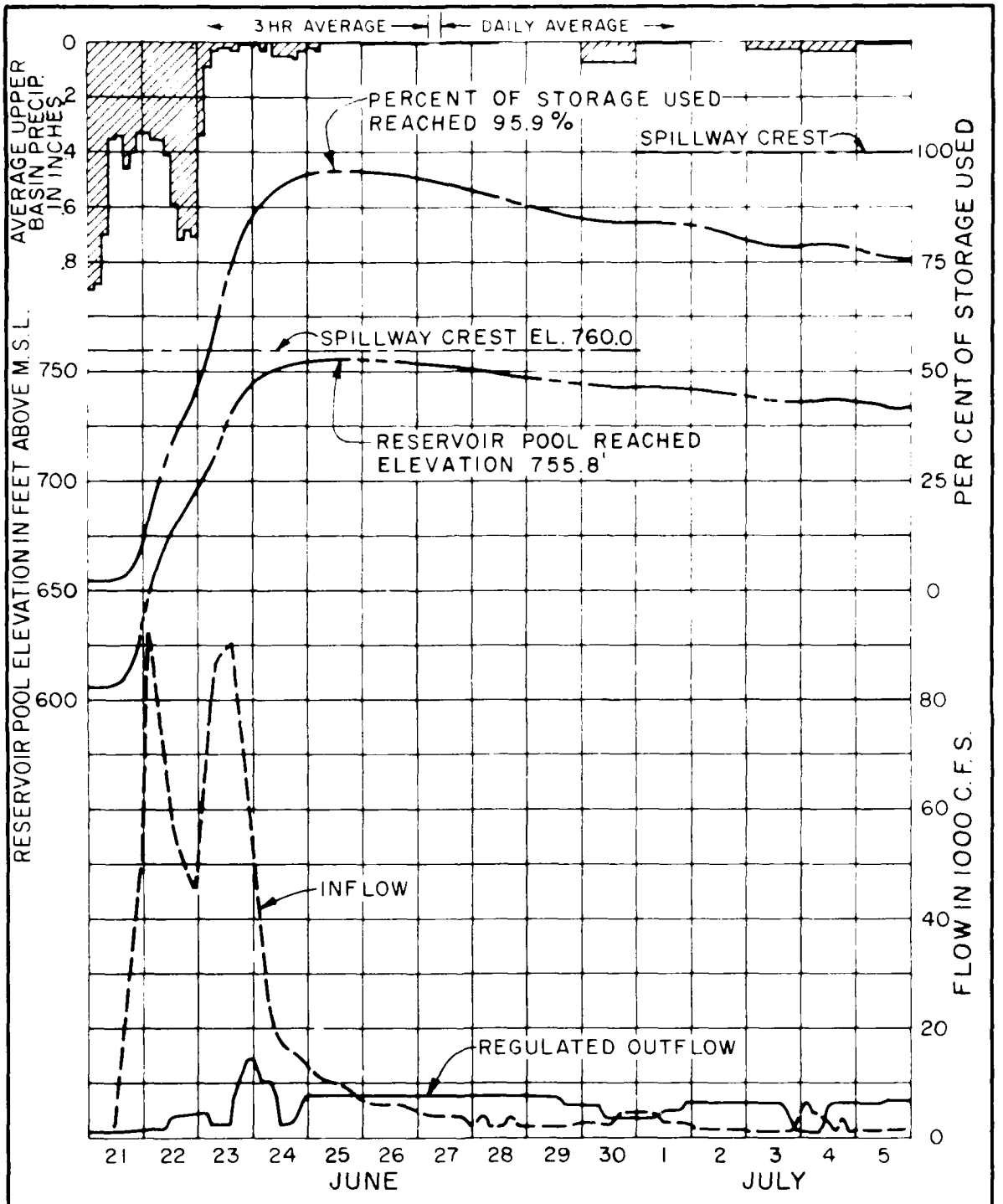
RESULTS: OVERTOP SPILLWAY AT 2400 HOURS, 25 JUNE. PEAK OUTFLOW = 4600 C.F.S., PLUS DEBRIS.

DASHED LINE BEGINS WHEN OVER TOPPING OCCURS AND INCLUDES DISCHARGE OVER SPILLWAY.

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
LOWER GENESEE RIVER BASIN

ALTERNATIVES TO MT. MORRIS OPERATIONS

U S ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

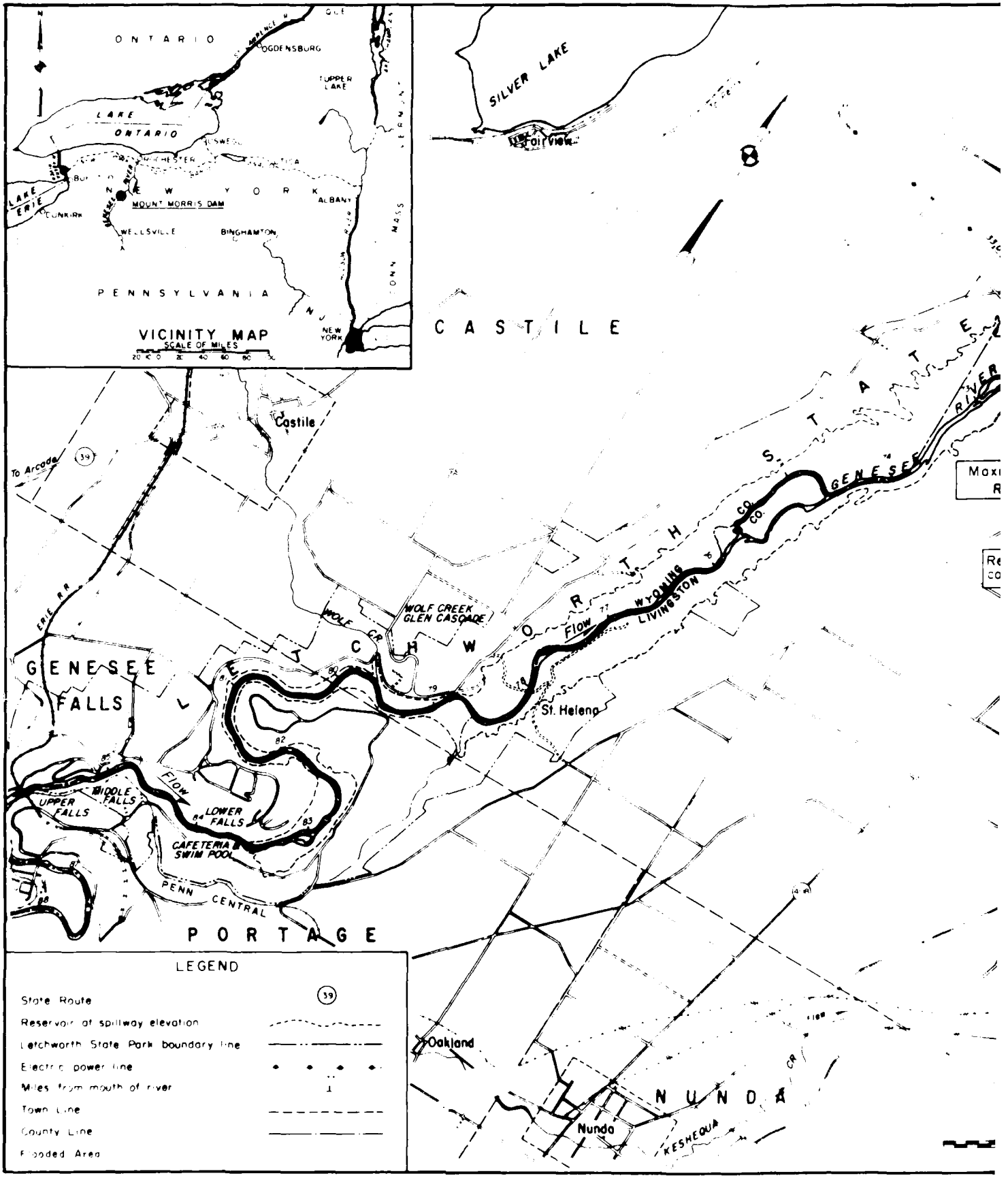


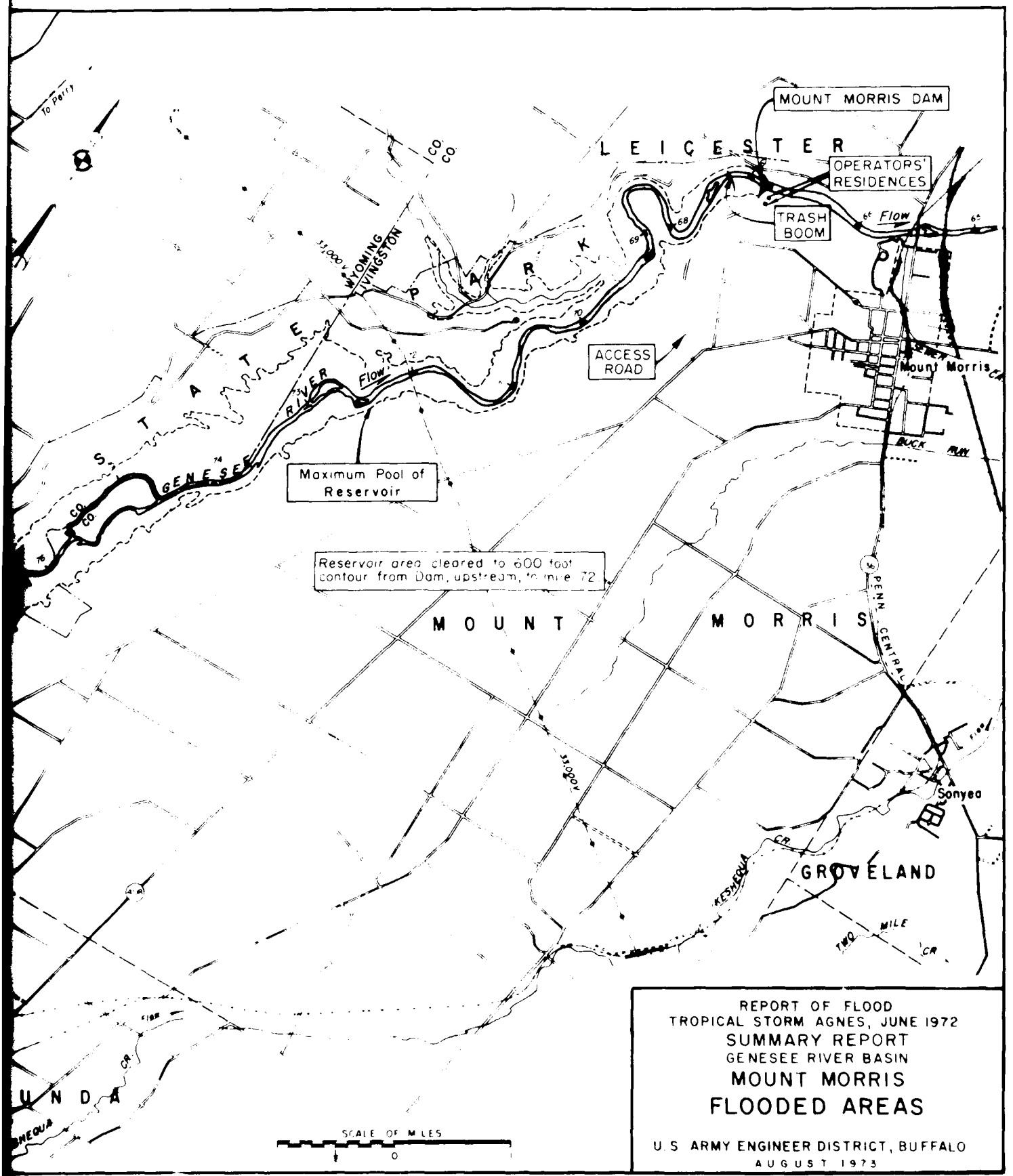
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
GENESEE RIVER BASIN

RESERVOIR OPERATION
MT. MORRIS LAKE

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

PLATE 29


ONTARIO
OGDENSBURG
LAKE ONTARIO
ROCHESTER
BUFFALO
NEW YORK
ALBANY
LAKE ERIE
DUNKIRK
MOUNT MORRIS DAM
WELLSVILLE
BINGHAMTON
PENNSYLVANIA
NEW YORK
VICINITY MAP
SCALE OF MILES
SILVER LAKE
Fairview
CASTILE
Castile
To Arcade
39
GENESEE FALLS
WOLF CREEK
GLEN CASCADE
WOLF CR
FLOW
WYOMING
LIVINGSTON
St. Helena
GENESEE
STATE
RIVER
ROUTE
CO.
CO.
ERIE RR
UPPER FALLS
MIDDLE FALLS
LOWER FALLS
CAFETERIA
SWIM POOL
PENN CENTRAL
PORTAGE
Oakland
Nunda
NUNDA
KESHEQUA
LEGEND
State Route
Reservoir at spillway elevation
Letchworth State Park boundary line
Electric power line
Miles from mouth of river
Town Line
County Line
Flooded Area



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
GENESEE RIVER BASIN
MOUNT MORRIS
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

SUMMARY

Tropical Storm "Agnes" is notable in that it produced the "flood of record" in many locations in the Genesee River Basin. Of significance are the facts that:

1. Record rainfalls were experienced over large portions of the basin.

2. The duration of significant rainfall was approximately 2-1/2 days.

3. Rainfall intensity was relatively high.

4. The rainfall generally moved in a downstream direction. It is probable that this condition aggravated the flood situation in the reaches near Mount Morris Lake when high local flows combined with high flows from the upstream reaches.

5. There was a large volume of runoff as indicated by the volume duration frequency analysis.

6. The magnitude of flows from Agnes was considerably greater than those of the past at gaging stations with long periods of record.

7. Mount Morris Lake was instrumental in reducing flows into the Lower Genesee River.

Table 14 summarizes pertinent data for the 14 reaches on the Genesee River and Dyke Creek.

Table 14. - Estimated Flows and Frequency of Occurrence of the June 1972 Flood on the Genesee River and Dyke Creek

Reach	Drainage Area At Index Point (1) (Sq. Mi.)	Instantaneous Peak Flow (cfs)	Approximate Frequency (years)
Below Mt. Morris Lake			
1 - Rochester (2)	2,457	25,500 (6)	10
2 - Chili, Henrietta	2,413	25,000	10
3 - Avon	1,983	19,500	20
Avon Gage	1,666	16,360 (10)	30
4 - Jones Bridge (2)	1,419	17,500	60 (7)
Above Mt. Morris Lake			
6 - Portageville (2) (3)	982	83,900 (8)	285
		90,000 (9)	
7 - Fillmore	726	67,700	240
8 - Belfast	641	62,300	200
9 - Belvidere	483	52,300	190
10 - Belmont	418	48,200	150
11 - Scio (2) (3)	309	41,300	130
12 - Wellsville (4)	288	38,500	125
12 - Wellsville (5)	216	30,000 (11)	90
13 - Stannards Corners	212	24,500	55
14 - Shongo	179	20,200	35
Dyke Creek at mouth	72	12,000	155

(1) All drainage areas are at reach index points except Avon gage, and Dyke Creek at mouth.
(2) Water recording gage located here.
(3) Water recording gage destroyed during June 1972 flood.
(4) Downstream of confluence with Dyke Creek.
(5) Upstream of confluence with Dyke Creek.
(6) Estimated flow assuming no influence from Court Street dam regulation.
(7) Large releases from Mount Morris had a significant effect on frequencies at this location.
(8) Corps of Engineers estimate.
(9) U.S.G.S. estimate.
(10) Reflects temporary shift in stage-discharge relationship.
(11) Includes overflow from Dyke Creek estimated at 5,600 cfs.

OSWEGO RIVER BASIN

General

The Oswego River Basin is located in West-Central New York It has a total drainage area of 5,081 square miles. The basin is located over three physiographic areas. The Ontario Lowland, about 20 miles wide and generally level about 400 to 500 feet above mean sea level, is located over the northern section of the basin. The northern margin of the Allegany Plateau covers most of the southern section of the basin with moderately steep slopes to an elevation of 2,000 feet and many valley filled lakes. Part of the Tug Hill Plateau covers the northeastern portion of the basin and has a uniform slope from an elevation of 400 to an elevation of 2,000 feet. The hydrographic character of the basin is controlled by the local geology. The geologic profile across the area is governed by the stratigraphy and erosional history, and by the modification of relief from glaciation.

New York State Barge Canal

The New York State Barge Canal crosses the northern portion of the basin. It was completed in 1918 and provides a 12-foot draft. Extensions have been made to Seneca, Cayuga, and Onondaga Lakes, and Lake Ontario via the Oswego River Canal. The canal system is regulated and maintained by the State of New York.

Lakes

The Finger Lakes and Oneida Lake are the major lakes in the Basin. Drainage of the Finger Lakes is northward and channelled east into the Oswego River and then into Lake Ontario. Storage in these lakes reduce the peak flows downstream considerably.

Rivers

The Seneca River, which is the largest tributary of the Oswego River, is 62 miles long and has a drainage area of 3,458 square miles. It flows in a northeasterly direction from Seneca Lake to the community

of Three Rivers. The river is canalized throughout, with its fall of 82 feet having been concentrated at five dams equipped with locks. Three of these locks, whose combined lift equals 63.5 feet, are in the 11 miles between Seneca Lake and Seneca Falls. Above Seneca Falls, the dam at Waterloo controls the levels of Seneca Lake; below Seneca Falls, the dam at Mud Lock controls the level of Cayuga Lake.

The Clyde River, largest of the Seneca River tributaries, is formed by the junction of Canandaigua Outlet and Ganargua Creek at Lyons, 19 miles above the Seneca River. The total drainage area is 895 square miles, of which 309 are drained by Ganargua Creek and 445 by Canandaigua Outlet.

The Oneida River combines with the Seneca River at Three Rivers to form the Oswego River. It has a drainage area of 1,474 square miles. It is 18 miles long and meanders in a westerly direction from Oneida Lake to Three Rivers. Parts of the river have been canalized and combined with land cuts across bends to form a 9-mile long canal between the same points.

The Oswego River is formed by the junction of the Seneca and Oneida Rivers at Three Rivers. From this junction it flows 23 miles northwest to Lake Ontario at the City of Oswego. The river has been canalized and has a fall of 188 feet concentrated at seven sites by dams and locks.

Climatology

There are at present, a number of water stage recorders operated by the U. S. Geological Survey throughout the Oswego River Basin. Table 15 is a summary of Peak Lake Stages. A summary of Peak Stream Stages and Discharges is given in Table 16.

Rainfall started on the morning of the 21st in the Oswego River Basin. The heaviest rainfall occurred over the southwestern portions of the basin. Six day total storm rainfall ranged from 10 inches in

southwestern sections to 3 inches near Lake Ontario. Average basin precipitation for the period 21-26 June was 5.8 inches. Bucket survey data indicate a number of areas in the southwestern section of the basin in excess of 10 inches of rain.

Table 15. - Summary of Peak Lake Stages (1)

Lake and Place of Determination	Drainage Area (sq. mi.)	Period of Record	Maximum Previously Known: Year	Maximum Previously Known: Gage Height (ft.)	Maximum During June 1972 Flood: Day	Maximum During June 1972 Flood: Gage Height (ft.)
Canandaigua Lake at Canandaigua	184	1928-72	1956	9.54	24	10.94
Cayuga Lake at Ithaca	1,564	1905-25, 1956-72	1916	8.4	26	9.77
Keuka Lake at Hammondsport	182	1961-72	1961	5.79	24	9.35
Oneida Lake at Brewerton	1,382	1952-72	1960	10.69	26	11.84
Onondaga Lake at Liverpool	285	1970-72	1971	8.47	30	10.26
Otisco Lake at Otisco	43	1913-72	1913	788.43 (2)	-	788.97 (2)
Owasco Lake near Auburn	205	1968-72	1971	714.20 (2)	25	716.48 (2)
Seneca Lake at Watkins Glen	704	1957-72	1964	8.56	25	10.45
Skaneateles Lake at Skaneateles	72.7	1890-1972	1922	4.5	25	5.20

(1) From "A Summary of Peak Stages and Discharges in New York for the Flood of June 1972" by Kenneth I. Darmer for the U. S. Department of the Interior Geological Survey Water Resources Division.
(2) Elevations shown are U.S.C. & G.S. Datum.

Table 16. - Summary of Peak Stream Stages and Discharges (1)

Stream and Place of Determination	Drainage Area (Sq.Mi.)	Period of Record	Maximum Flood Previously Known: Date	Gage Height (feet)	Discharge (cfs)	Maximum During June 1972 Flood: Day	Gage Height (feet)	Discharge (cfs)
Catharine Cr. at Montour Falls	38.2							3,150
Hector Falls Cr. at Burdett	11.8	1935 1971-72	1935		4,600			1,500
Keuka Lake Outlet at Dresden	207	1965-72	1971	5.17	2,320	22	8.38	2,680
Canandaigua Lake Outlet at Chapin	195	1940-72	1942	4.64	1,100	24	5.62	1,970
Flint Creek at Potter	31	1964-68 1971-72	1964	6.87	920	23	10.15	1,300
Flint Creek at Phelps	102	1960-72	1960 1963	5.83 6.20	2,940	24	5.75	2,810
Black Brook at Tyre	19	1966-72	1966	2.70	258		3.61	430
Owasco Inlet at Moravia	106	1960-68	1961 1964	12.21 12.76	11,600	23	16.17	-
Owasco Outlet near Auburn	206	1914-72	1936	4.88	2,090	23	6.28	3,140
Seneca River at Baldwinsville	3,136	1950-71	1960	9.21	17,200	28 30	9.21	17,200

(1) From "A Summary of Peak Stages and Discharges in New York for the Flood of June 1972" by Kenneth I. Darmer for the U. S. Department of the Interior Geological Survey Water Resources Division.

Table 16. - Summary of Peak Stream Stages and Discharges (Cont'd)(1)

Stream and Place of Determination	Drainage Area (Sq.Mi.)	Period of Record	Maximum Flood Previously Known: Date	Gage Height (feet)	Discharge (cfs)	Maximum During June 1972 Flood: Day	Gage Height (feet)	Discharge (cfs)
Onondaga Cr. at Dorwin	88.5	1952-72	1960	5.06	7,130			
			1961	5.11	-	24	4.80	3,670
Onondaga Cr. at Spencer St., Syracuse	109	1971-72	1971	6.74	1,640	23	8.09	3,400
Harbor Brook at Syracuse	9.63	1960-72	1969	7.13	374	23	7.45	458
Harbor Brook at Hiawatha Blvd., Syr.	11.3	1971-72	1971	6.17	410	21	6.55	474
Nine Mile Cr. near Marietta	45.5	1965-72	1971	5.36	343	22	8.65	1,030
Nine Mile Cr. at Camillus	84.3	1959-72	1960	8.25	2,760	23	8.73	1,930
Nine Mile Cr. at Lakeland	115	1971-72	1971	7.12	1,600	23	8.58	2,290
Keshong Cr. near Bellona	30.7	1966-72	1967	3.94	-	-	3.19	2,600
Kendig Cr. near MacDougall	13.8	1965-72	1971	6.23	-	-	4.93	400
Cayuga Inlet near Ithaca	36.7	1937-72	1942	7.58	4,110	23	8.10	4,900
Butternut Cr. near Ithaca	11.3	1962-69					9.94	1,060

(1) From "A Summary of Peak Stages and Discharges in New York for the Flood of June 1972" by Kenneth I. Darmer for the U. S. Department of the Interior Geological Survey Water Resources Division.

Table 16. - Summary of Peak Stages and Discharges (Cont'd)(1)

Stream and Place of Determination	Drainage Area (Sq.Mi.)	Period of Record	Maximum Flood Previously Known: Date	Gage Height (feet)	Discharge (cfs)	Maximum During June 1972 Flood: Day	Gage Height (feet)	Discharge (cfs)
Cayuga Inlet at Ithaca	86.5	1971-72	1971	10.74	5,200		14.6	11,800
Coy Glen Cr. at Ithaca	3.55							516
Sixmile Cr. near Ithaca	42.0	1966-69; 1971-72	1966	3.82			9.37	5,360
Sixmile Cr. at Potters Falls at Ithaca	45.5	1935	1935		4,330			4,430
Virgil Cr. at Dryden	20.6	1966-72	1967	2.58	656		3.90	1,400
Falls Cr. at Ithaca	126	1908-09; 1925-72	1935	9.52	15,500	23	5.38	5,860
Salmon Cr. at Ludlowville	81.7	1964-68; 1971-72	1966	7.23	1,940		10.62	4,160
Mud Cr. at East Victor	64.7	1958-68	1963	6.65	1,370		7.90	1,600
Canargua Cr. at Macedon	104	1965-69	1966	5.91	1,520		6.80	1,950
West River near Middlesex	29.3	1965-72	1967	3.16	242		6.82	2,790

(1) From "A Summary of Peak Stages and Discharges in New York for the Flood of June 1972" by Kenneth I. Darmer for the U. S. Department of the Interior Geological Survey Water Resources Division.

Table 16. - Summary of Peak Stream Stages and Discharges (Cont'd)(1)

Stream and Place of Determination	Drainage Area (Sq.Mi.)	Period of Record	Maximum Flood Previously Known: Date	Gage Height (feet)	Discharge (cfs)	Maximum During June 1972 Flood: Day	Gage Height (feet)	Discharge (cfs)
East Branch Fish Cr. at Taberg	188	1924-72	1945	10.90	13,600	22	11.71	14,500
Oneida Cr. at Oneida	113	1950-72	1950 1959	13.78 14.30	7,440	22	14.61	9,260
Limestone Cr. at Fayetteville	85.5	1940-72	1950	7.78	7,010	23	7.56	3,800
Butternut Cr. near Jamesville	32.2	1959-72	1962 1964	7.54 6.29	1,260	21	7.15	1,120
Meadow Br. at Hurlburt Rd. Syracuse	12.9	1971	1971	3.10	126	21	3.35	156
Scriba Cr. near Constantia	38.4	1966-72	1971	6.45	870	22	7.42	1,200
Oneida River at Caughdenoy	1,382	1903-12 1948-72	1903		13,800	25		10,100
Oswego River at Lock 7, Oswego	5,098	1901-06 1934-72	1936 1940	13.46	37,500	29	11.87	32,500

(1) From "A Summary of Peak Stages and Discharges in New York for the Flood of June 1972" by Kenneth I. Darmer for the U. S. Department of the Interior Geological Survey Water Resources Division.

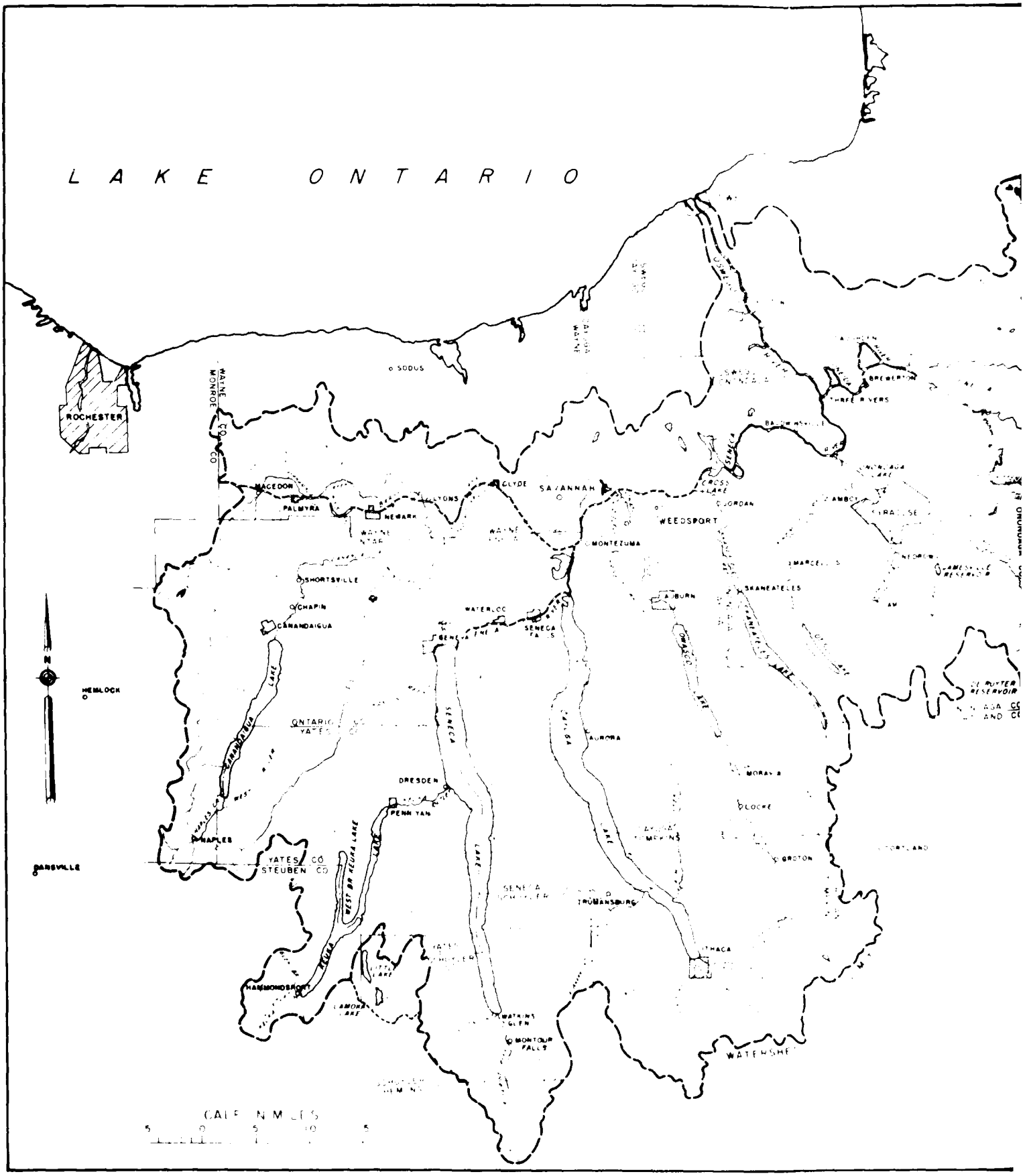
Areas Subject to Flooding

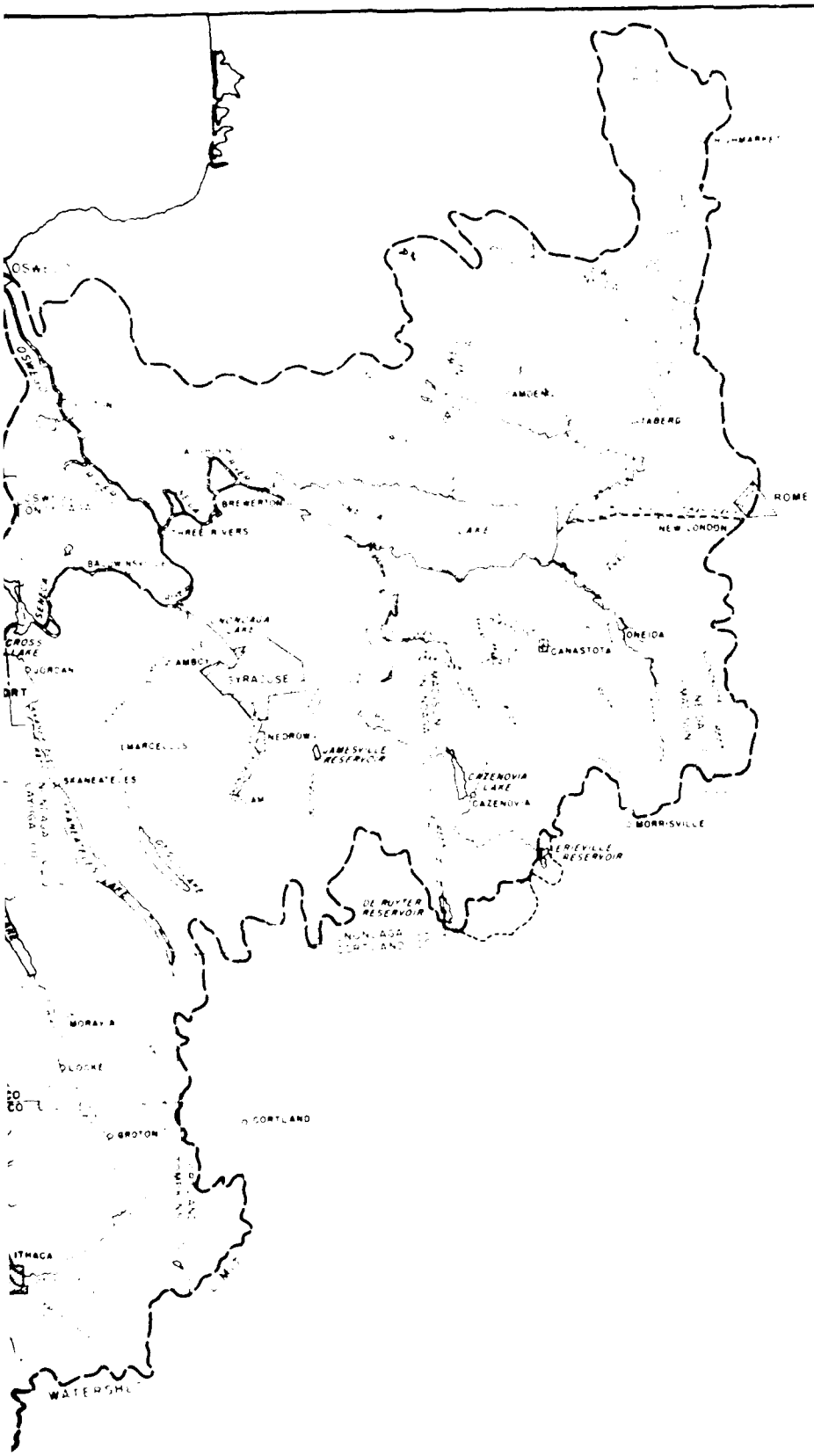
The areas subject to flooding along the Barge Canal and the Lake outlets are shown on Plates 32 through 46. Plate 31 is an index map that shows the location of these flooded area maps. Primary flooding in the Oswego River Basin occurs at headwater areas where the tributary drainage area is 200 square miles or less. Stream slopes are steep resulting in unusually high velocities. This type of flooding occurs over large sections of the basin in springtime due to the addition of snowmelt. Highest peaks occur in the summer over small areas that are affected by localized storms. Principal damage is to agricultural and pasture land.

Flood stages in the lakes are reduced due to their regulation, but remain for a longer period of time. Principal damage is to docks, marinas, and cottages. Towns at the inlets and outlets of the lakes are generally built up, and most of the damage is to low lying recreational and commercial establishments.

Flooding is usually severe at the confluence of lake outlets with the Barge Canal. Here overland flooding extends primarily to some of the most productive agricultural areas in New York State.

Total estimated damages for the Oswego River Basin are listed in Table 17.


LAKE ONTARIO
ROCHESTER
MONROE CO
WAYNE CO
SODUS
MACEDON
PALMYRA
NEWARK
LYONS
CLYDE
SAVANNAH
WEEDSPORT
MONTEZUMA
SHORTSVILLE
CHAPIN
CANANDAIGUA
WATERLOO
SENECA FALLS
AUBURN
SKANEATELES
HEMLOCK
ONTARIO CO
YATES CO
DRESDEN
PENN YAN
NAPLES
YATES CO
STEUBEN CO
AURORA
MORAVIA
GROTON
TRUMANSBURG
ITHACA
WATKINS GLEN
MONTOUR FALLS
THREE RIVERS
BREWERTON
SYRACUSE
JORDAN
CROSS LAKE
SENECA
CAYUGA
OWASCO LAKE
SKANEATELES LAKE
CANANDAIGUA LAKE
KEUKA LAKE
WEST BRANCH
CANANDAIGUA OUTLET
HAMMONDSPORT
CAMPBELL
CORNING
WATERSHED
STATUTE MILES
5 0 5 10 15



PLATE

OSWEGO

FULTON

PHOENIX

THREE RIVERS

ONEIDA RIVER
BREWERTON

SENECA RIVER
BALDWINSVILLE

SENECA RIVER
CROSS LAKE

SENECA RIVER
WEEDSPORT

SENECA RIVER
SAVANNAH

CLYDE AND SENECA RIVERS
CLYDE

SENECA RIVER
WATERLOO

CLYDE RIVER
CLYDE-LYONS

NEW YORK STATE BARGE CANAL
LYONS

NEW YORK STATE BARGE CANAL
NEWARK

NEW YORK STATE BARGE CANAL
PALMYRA

REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN

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U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

Table 17. - Total Estimated Damage from June 1972 Flood in the Oswego River Basin

Location	Residential	Commercial	Public and Other (1)	Agricultural (2)	Total
	$	$	$	$	$
Barge Canal	959,000	611,000	546,000		2,116,000
Canandaigua Lake	308,000	1,152,000	49,000	Included	1,509,000
Cayuga Lake	614,000	825,000	268,000		1,707,000
Keuka Lake	722,000	392,000	109,000	in	1,223,000
Oneida Lake	664,000	777,000	59,000		1,500,000
Onondaga Lake	-	-	375,000	County	375,000
Otisco Lake	29,000	-	52,000		81,000
Owasco Lake	167,000	6,000	42,000	Totals	215,000
Seneca Lake	417,000	657,000	364,000		1,438,000
Skaneateles Lake	77,000	68,000	23,000		168,000
Cayuga County			3,492,000	4,469,000	7,961,000
Chemung County	Included in		92,000	68,000	160,000
Madison County			344,000	3,738,000	4,082,000
Oneida County	the		384,000	211,000	595,000
Onondaga County			768,000	1,685,000	2,453,000
Ontario County	Lake and Barge		699,000	5,546,000	6,245,000
Oswego County			65,000	2,140,000	2,205,000
Schuyler County	Canal Totals		651,000	452,000	1,103,000
Seneca County			53,000	1,220,000	1,273,000
Steuben County			897,000	507,000	1,404,000
Tompkins County			1,217,000	445,000	1,662,000
Wayne County			14,000	6,025,000	6,039,000
Yates County			1,109,000	4,027,000	5,136,000
TOTAL	3,957,000	4,488,000	11,672,000	30,533,000	50,650,000

(1) Includes damage reported to OEP.
(2) Furnished by U. S. Department of Agriculture, Soil Conservation Service. Includes damages due to inundation and extensive loss of field and cash crops due to excessive rain.

OSWEGO RIVER BASIN LAKES

The lakes discussed in this section of the report are: Canandaigua, Cayuga, Keuka, Oneida, Onondaga, Otisco, Owasco, Seneca, and Skaneateles. These lakes provide the setting for some of the most beautiful vacationland in the State of New York. The flooding associated with Tropical Storm Agnes affected each of the above-mentioned lakes. Record high levels were experienced on some of them and significant flood damage was incurred by all of them. Table 18 lists the estimated damages for the June 1972 flood.

Table 18. - Estimated Damage Data on the Lakes in the Oswego River Basin

Lake	Estimated June 1972 Flood Damage			Total
	Residential	Commercial	Public and Other	
	$	$	$	$
Canandaigua	308,000	1,152,000	49,000	1,509,000
Cayuga	614,000	825,000	268,000	1,707,000
Keuka	722,000	392,000	109,000	1,223,000
Oneida	644,000	777,000	59,000	1,500,000
Onondaga	-	-	375,000	275,000
Otisco	29,000	minor	52,000	81,000
Owasco	167,000	6,000	42,000	215,000
Seneca	417,000	657,000	364,000	1,438,000
Skaneateles	77,000	68,000	23,000	168,000
TOTAL	2,998,000	3,877,000	1,341,000	8,216,000

Figures 29 through 37 show flood conditions on the Lakes during the storm occurrence.

Canandaigua Lake

The shoreline of Canandaigua Lake is almost completely utilized with cottages, recreation areas and permanent homes. Areas that are not developed are in the southern portion of the lake which is a Game Management Area, and areas along the shoreline that lie beneath steep banks. The majority of development is on the northeast portion of the lake perimeter. In recent years there has been a gradual trend of converting summer cottages into permanent homes adding to the flood damage potential.

There is a U. S. Geological Survey water stage recorder on Canandaigua Lake. Table 19 lists the five highest recorded stages and their approximate frequency. The June 1972 flood has an approximate frequency of occurrence of 90 years. It was approximately 1.4 feet higher than the previous flood stage of record, that which occurred in 1956.

Figure 29 shows flooding conditions at the north end of the lake.

Table 19. - Five Highest Stages on Canandaigua Lake for the Period 1911-1922, 1927, 1929-1972

Order of Magnitude	Elevation*	Year	Approximate frequency (yrs.)
1	691.7	1972	90
2	690.3	1956	30
3	690.2	1936	20
4	689.8	1940	15
5	689.6	1929	10

* Gage located at Canandaigua. Elevations are on mean sea level (MSL) datum, Corps of Engineer levels.

Figure 29. Aerial view looking west of flooding at north end of Pennsylvania Ave. Photo taken 26 June 1972.

Cayuga Lake

Cayuga Lake is the second largest of the Finger Lakes. It is quite deep except at both the north and the south ends where relatively shallow water occurs. The shoreline is intensively developed with cottages except where development is physically impractical or impossible. Recreation is a major influence in the economy of the area where the natural beauty of the glens and forests attracts thousands of visitors each year.

Lake levels are regulated by the control structure at Mud Lock. Regulation of Lake levels by this structure is to maintain required navigation levels and alleviate flooding on Seneca and Oswego Rivers. "Agnes" proved to be too much for the normal methods of alleviating floods and the lake level rose over three feet from 20 June to 24 June to a point approximately one foot above the previously recorded record high lake level of 1936 and 1916.

There is a U.S.G.S. water stage recorder on Cayuga Lake at Ithaca. Table 20 lists the five highest recorded stages on Cayuga Lake and their approximate frequency. The June 1972 flood has an approximate frequency of 125 years.

Figures 30 and 31 show flood conditions on Cayuga Lake.

Table 20. - Five Highest Stages on Cayuga Lake for the Period 1905-1972

Order of Magnitude	Elevation	Year	Approximate Frequency (yrs.)
1	387.8*	1972	125
2	386.6	1936	20
3	386.6	1916	20
4	386.4	1914	15
5	386.4	1927	15

*U.S.G.S. continuous recording gage located at Ithaca, NY, 1968-present. All other levels were recorded at Cayuga, NY, and represent a daily reading. Elevations are on Barge Canal datum.

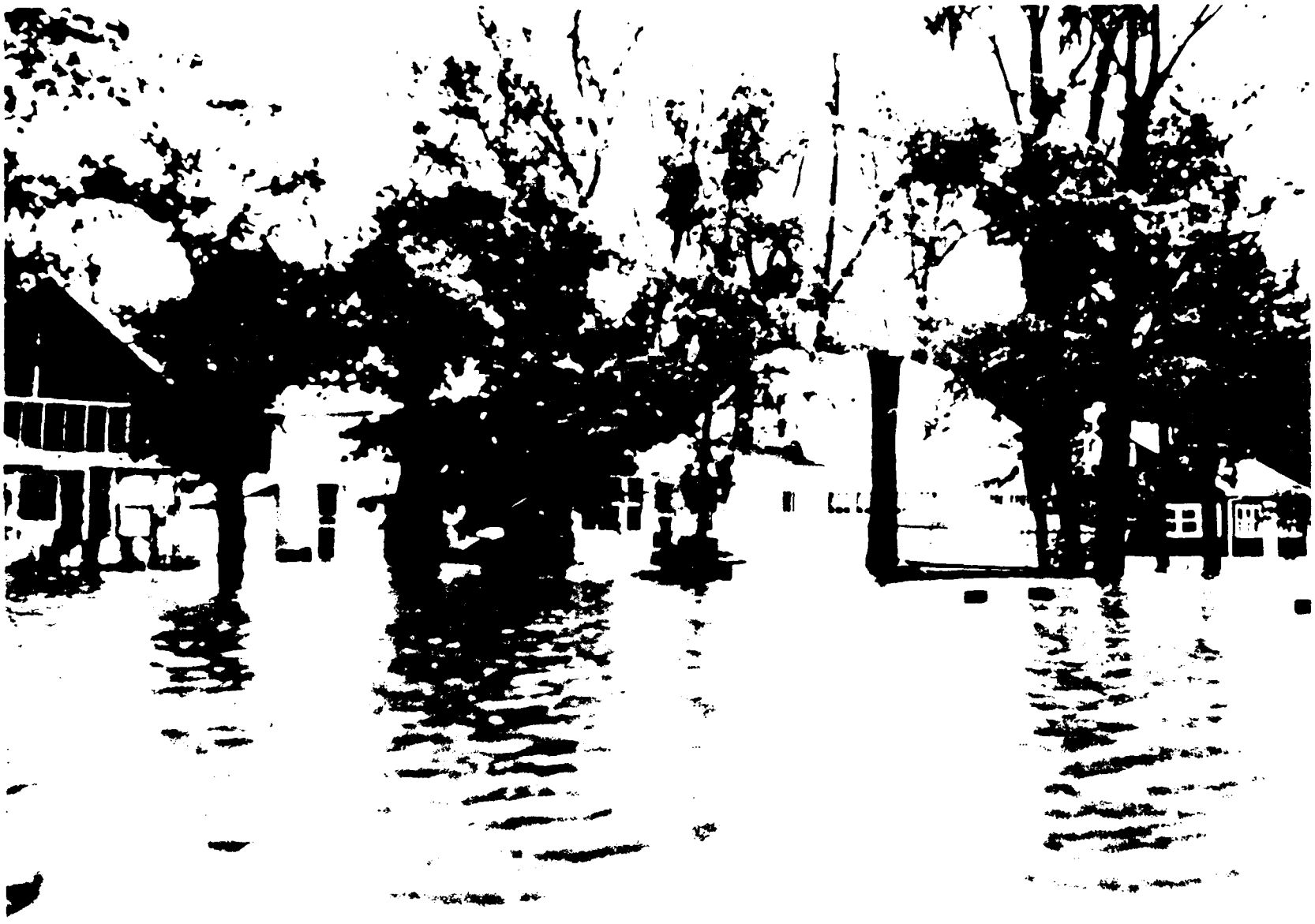


Figure 3. Inundated homes at Myers Point on southeasterly shore of Cayuga Lake. Photo taken 24 June 1972.

Keuka Lake

Keuka Lake is rather extensively developed with both seasonal and permanent residences which account for the relatively high flood damage. The June 1972 flood stage was the second highest of record and was exceeded by approximately one foot back in 1872. The June 1972 flood stage has an approximate frequency of 85 years. Table 21 lists the five highest recorded stages for Keuka Lake and their approximate frequency.

Outflow from the lake is regulated by a dam near the Main Street bridge by the City of Penn Yan about one mile from the lake. The dam is operated in accordance with a rule curve developed by the Corps of Engineers. The outflow from Keuka Lake empties into Seneca Lake which at the time was experiencing flood problems of its own.

Inspection of the isohyetal map on Plate 2 shows that Keuka Lake is located in the part of the basin that received the most rainfall. Approximately ten inches of rain fell on the Keuka Lake drainage area from 21 to 26 June.

Table 21. - Five Highest Stages on Keuka Lake for the Period 1872, 1894, 1904, 1912-16, 1920-72

Order of Magnitude	Elevation*	Year	Approximate frequency (yrs.)
1	720.7	1872	180
2	719.7	1972	85
3	719.0	1935	50
4	718.5	1936	30
5	718.1	1894	25

* Gage located at Penn Yan. Elevations are on United States Coast and Geodatic Survey (U.S.C. & G.S.) datum.

Oneida Lake

Oneida Lake is the largest in the Oswego River Basin. Its shores are low and flat and there are large swampy areas on all sides. The New York State Barge Canal traverses Oneida Lake and its levels are regulated by a dam at Caughdenoy.

For the residents along Oneida Lake, the June 1972 flood was the second one of the year. Spring runoff had produced flooding early in May and the water had receded considerably from the first flood when "Agnes" occurred.

The June 1972 flood stage had been exceeded by 0.7 foot in 1936. However, due to recent development, the June 1972 flood was the most damaging flood ever recorded on Oneida Lake.

There is a U.S.G.S. water stage recorder on Oneida Lake at Brewerton. Table 22 lists the five highest recorded stages on Oneida Lake and their approximate frequency. The June 1972 flood has an approximate frequency of 50 years.

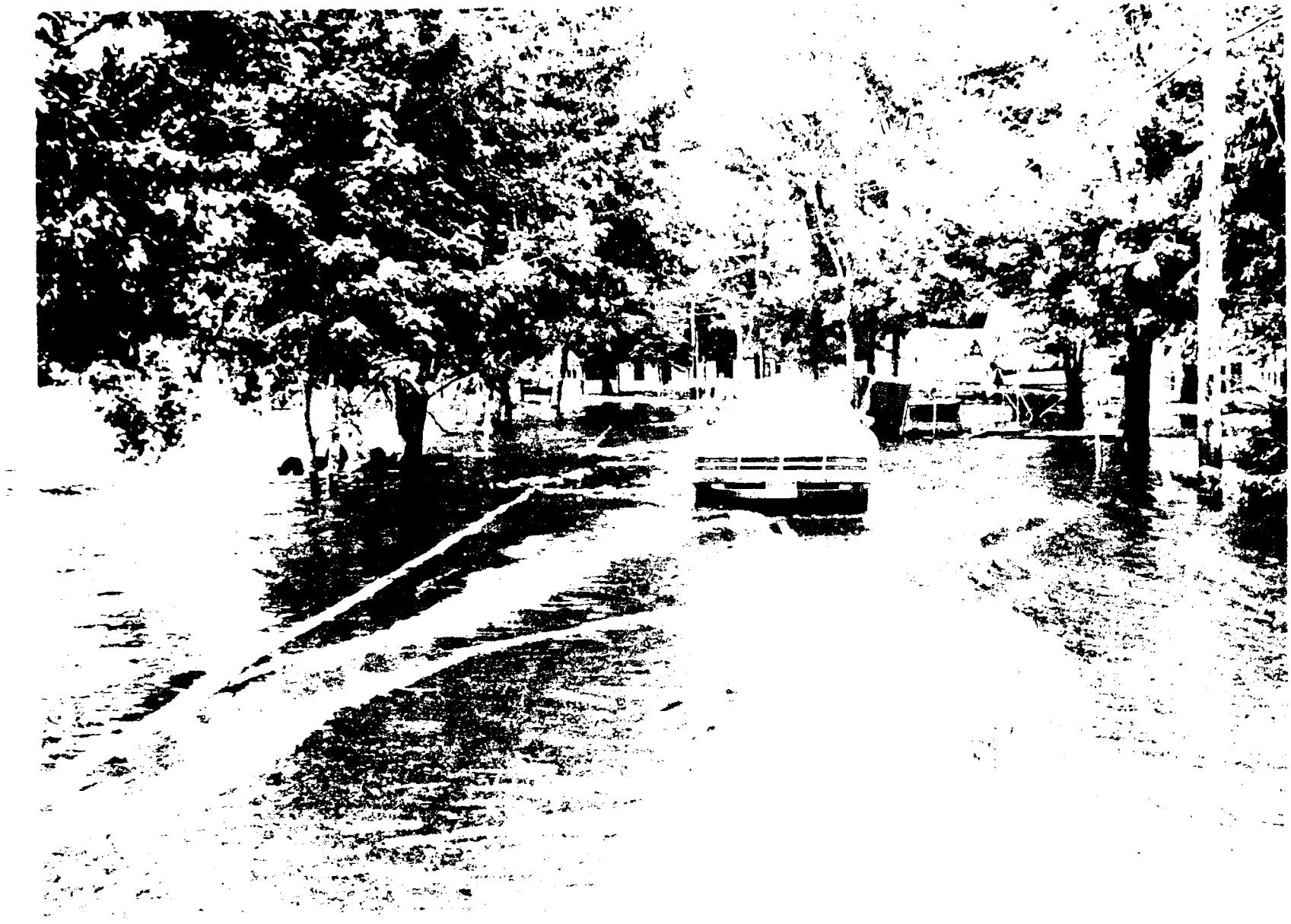
Figures 32 and 33 show flooding in the Long Point Road and Muskrat Bay areas, respectively.

Table 22. - Five Highest Stages on Oneida Lake for the Period 1925-1972

Order of Magnitude	Elevation (1)	Year	Approx. Frequency (yrs.)
1	374.9 (2)	1936	100
2	374.2 (3)	1972	50
3	374.1 (2)	1940	40
4	373.9 (2)	1926	35
5	373.8 (2)	1925	30

(1) Elevations are on Barge Canal datum.
(2) Gage located at Caughdenoy.
(3) Gage located at Cleveland.

Figure 32 Aerial view looking west along Long Point Road at flood conditions on Oneida Lake. Photo taken [illegible] June 1973.



Onondaga Lake

Onondaga Lake is unique in that there is no residential development around it. It is surrounded by a park, railroad embankment, highway embankment, and the Allied Chemical Company complex.

Considering the size of the lake, and the development around it, damage on the lake was relatively high. This is due in large part to the sedimentation that occurred in the New York State Barge Canal Terminal area on the inlet to the lake which required extensive dredging. The Onondaga Yacht Club Marina, the only one on the lake, was inundated and incurred considerable damage (See Figure 34).

The levels on this lake are controlled by the water surface elevation on the Barge Canal which remained relatively high due to the large outflows from Canandaigua, Cayuga, Keuka, Owasco, Seneca, and Skaneateles Lakes. Also, Otisco Lake drains directly into Onondaga Lake by way of Nine Mile Creek. All these factors plus approximately five inches of rainfall from 21 to 26 June contributed to the resultant high lake level.

The June 1972 flood stage has an approximate frequency of 20 years. Table 23 lists the five highest recorded stages for Onondaga Lake and their approximate frequency.

Table 23. - Five Highest Stages on Onondaga Lake for the Period 1930-1972

Order of Magnitude	Elevation*	Year	Approximate frequency (yrs.)
1	371.6	1936	35
2	371.5	1940	30
3	370.8	1972	20
4	370.5	1960	15
5	370.0	1950	10

* Barge Canal Gage number 213 located at Syracuse.

Figure 34. Flood conditions at Onondaga Yacht Club on Onondaga Lake. Photo taken 26 June 1972.

Otisco Lake

Otisco Lake is one of the smaller lakes in the Oswego River Basin and where physically possible is considerably developed with cottages and permanent residences. The outlet for Otisco Lake is Nine Mile Creek and the outflows are regulated by a dam on the Creek which is operated by the Onondaga County Water Authority which uses Otisco Lake for water supply.

The June 1972 flood exceeded the previous record high lake level of 1913 by approximately 0.5 foot and caused damages on both Otisco Lake and Nine Mile Creek. Figure 35 shows flooding on Nine Mile Creek at Camillus. Nine Mile Creek also flows through the Village of Marcellus which also incurred flood damage.

Lake level records are kept by the Onondaga County Water Authority. Table 24 lists the five highest recorded stages and their approximate frequency. The June 1972 flood has an approximate frequency of occurrence of 100 years.

Table 24. - Five Highest Stages on Otisco Lake for the Period 1911-1964 and 1966-1972

Order of Magnitude	Elevation*	Year	Approximate frequency (yrs.)
1	789.0	1972	100
2	788.4	1913	30
3	788.2	1950	15
4	788.2	1956	15
5	788.2	1958	15

* Gage located at Otisco Lake Dam, U.S.C. & G.S. datum.

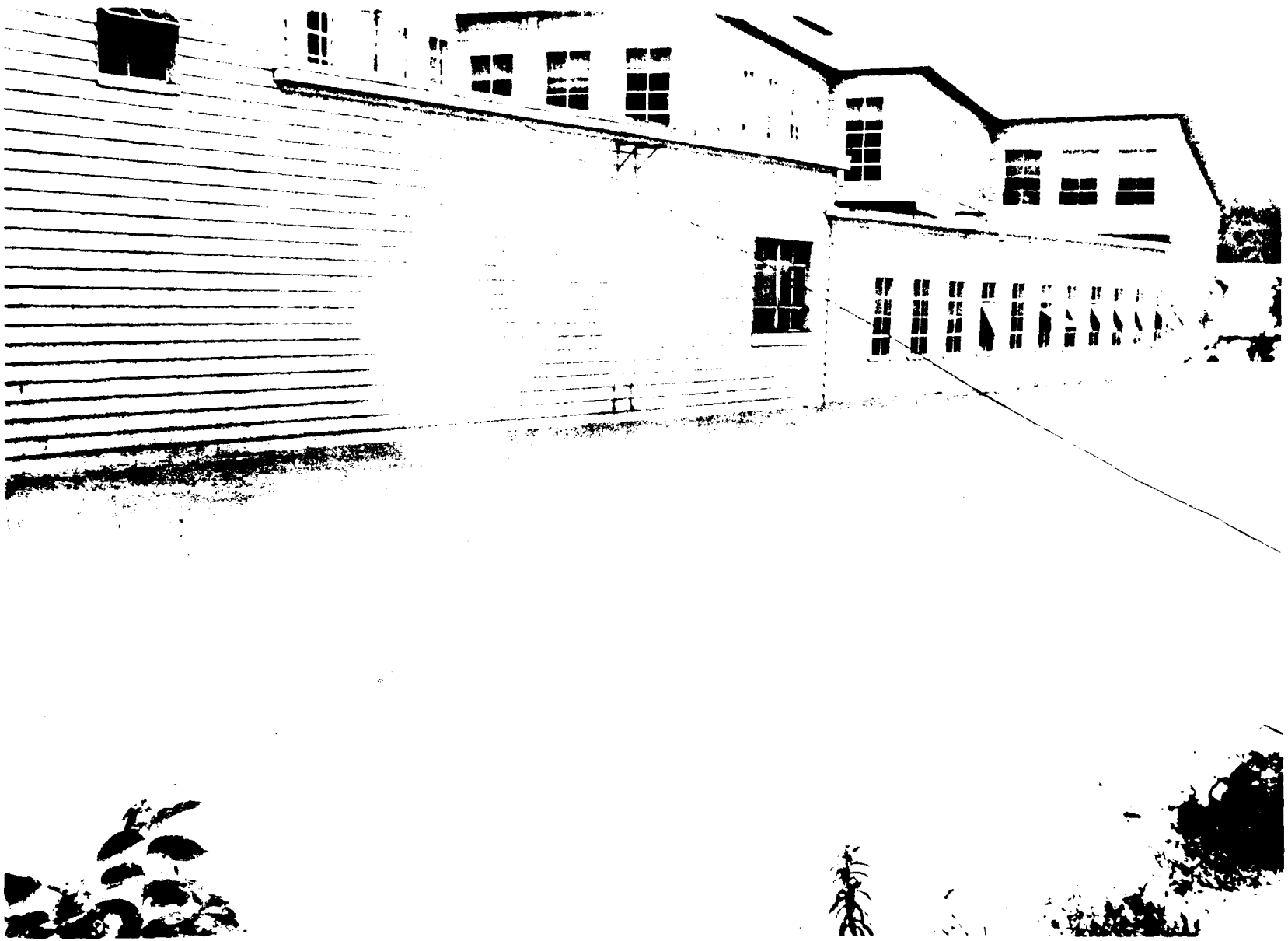


Figure 35. The Foundations on Minerva Creek at Camillus-Onondaga Co., Camillus, NY.

Owasco Lake

Owasco Lake is one of the smaller lakes in the Oswego River Basin and is considerably developed with cottages and permanent-type residences. The level of the June 1972 flood was higher than it had been since 1940 and it was feared that the State Dam might fail and send a large flood wave crashing through to the City of Auburn. The Dam is operated by the City of Auburn in accordance with a regulation schedule prepared by the Corps of Engineers.

Flooding has not been as severe recently as it was previous to adoption of the regulation schedule. However, the June 1972 flood was severe enough to cause a considerable amount of flood damage.

The Mill (Miller) St. Dam, downstream of the State Dam, of stone masonry construction remained intact. However, the west abutment was washed out, throwing the force of the Owasco Outlet against the bluff causing severe erosion. Figure 36 shows the water overtopping the west abutment and Figure 37 shows the new stream bed cut through it.

Table 25 lists the five highest recorded stages on Owasco Lake and their approximate frequency. The stage of the June 1972 flood was exceeded twice since 1920, and has an approximate frequency of occurrence of 20 years.

Table 25. - Five Highest Stages on Owasco Lake for the Period 1920-1972

Order of Magnitude	Elevation*	Year	Approximate frequency (yrs.)
1	712.5	1936	40
2	712.5	1940	40
3	712.0	1972	20
4	712.0	1924	15
5	711.6	1958	15

* Gage located in Auburn with elevations on City of Auburn datum.

Figure 36 Flood waters top west abutment of Mill (Miller) Street Dam in Auburn on the Owasco Outlet.

Figure 37. West end of Mill (Miller) Street Dam and stream bed cut through west abutment by flood waters.

Seneca Lake

Seneca Lake is the largest of the Finger Lakes and contributes substantially to the natural resources of New York State. The shoreline is intensively developed with cottages except where the banks are too high and steep to permit development.

There is a U.S.G.S. water stage recorder on Seneca Lake located in Watkins Glen. Table 26 lists the five highest recorded stages and their approximate frequency. The June 1972 flood has an approximate frequency of occurrence of 100 years.

Table 26. - Five Highest Stages on Seneca Lake for the Period 1913-1972

Order of Magnitude	Elevation	Year	Approximate frequency (yrs.)
1	450.4	1972	100
2	449.3	1935	40
3	448.8	1936	20
4	448.7	1950	15
5	448.6	1927	15

U.S.G.S. continuous recording gage located at Watkins Glen, NY, from 1957 to present. All other elevations are daily readings from the Barge Canal Gage located at Watkins Glen. Elevations are on Barge Canal datum.

Skaneateles Lake

Skaneateles Lake is located in the central part of the Oswego River Basin. Where possible, the shoreline is considerably developed with cottages and permanent-type residences. In recent years there has been a gradual trend of converting summer cottages to permanent residences.

The June 1972 flood on Skaneateles Lake reached a record level, breaking the previous record of 1922 by approximately 0.7 foot. Regulation of the lake became a source of irritation during the June 1972 flood as it has during past floods. Some residents on the lake felt that larger releases from the lake should have been made to help alleviate flood conditions on the lake while residents along Skaneateles Creek were of the opinion that larger releases would not have significantly reduced levels on the lake and would actually make matters worse by flooding them, too. The control structure was operated to convey by conduits as much water as possible to City of Syracuse reservoirs and to release as much water as possible down Skaneateles Creek without flooding the residents along it.

Lake level records are kept by the City of Syracuse. Table 27 lists the five highest recorded stages for Skaneateles Lake and their approximate frequency. The June 1972 flood stage has an approximate frequency of occurrence of 100 years.

Table 27. - Five Highest Stages on Skaneateles Lake for the Period 1920-1972

Order of Magnitude	Elevation*	Year	Approximate frequency (yrs.)
1	865.2	1972	100
2	864.5	1922	45
3	863.8	1923	15
4	863.7	1947	10
5	863.6	1950	10

* Gage located at Skaneateles, City of Syracuse Water Supply datum.

SENECA, CLYDE, ONEIDA, AND OSWEGO RIVERS AND THE NEW YORK STATE BARGE CANAL

The entitled rivers and the Barge Canal form the basic outflow network for the Lakes of the Oswego River Basin. Flooding along them is usually of longer duration than on other Buffalo District streams because of the prolonged periods of high outflows from the various lakes. Also flooding usually occurs during the spring before heavy agricultural and recreational losses can be realized. These floods are generally the result of snowmelt runoff, augmented by moderate amounts of rainfall, "Agnes" was different in that it occurred after planting and after much of the fertilizing had been completed, and at the onset of the boating and recreation season. These factors helped to make "Agnes" one of the most damaging storms ever felt in the Oswego River Basin.

Flood waters in the Barge Canal were well above normal and flooded the residential areas of Jack's Reef, Baldwinsville, Hayes Road, and Horseshoe Island. Most areas along the Barge Canal that were flooded are within the limits of flowage easements owned by New York State. People have bought and elected to build in these areas and consequently have tasted the ravages of flooding.

Agricultural and non-agricultural damages were determined separately and their damage reach limits are different. Tables 28 and 29 give the estimated June 1972 flood damages.

Figures 38 through 40 show flood conditions along the Seneca River.

The flooded areas on Seneca, Clyde, Oneida and Oswego Rivers and the New York State Barge Canal are shown on Plates 32 through 46.

Table 28. - Estimated Agricultural Damages in the Oswego River Basin

Reach	Acres Inundated	June 1972 Flood Damages (1)
		$
O-1	680	1,000
O-2	1,480	8,600
O-3	250	8,800
O-4	2,100	65,500
OS-1	70	4,200
S-3	1,350	19,500
S-4	6,150	522,000
S-5	5,170	15,100
S-6	2,390	59,500
S-7	1,000	15,100
S-8	0	0
S-9	1,000	26,100
S-10	1,470	2,900
S-11	730	6,900
S-12	210	200
S-13	1,110	3,800
S-14	1,110	1,100
C-1	160	100
C-2	1,030	9,400
C-3	2,910	12,400
C-4	290	6,100
C-5	2,960	24,000
C-6	2,060	64,200
TOTAL	35,680	876,500

(1) Based on price levels for the month of June, furnished by S.C.S. This table does not include hillside or tributary damage.

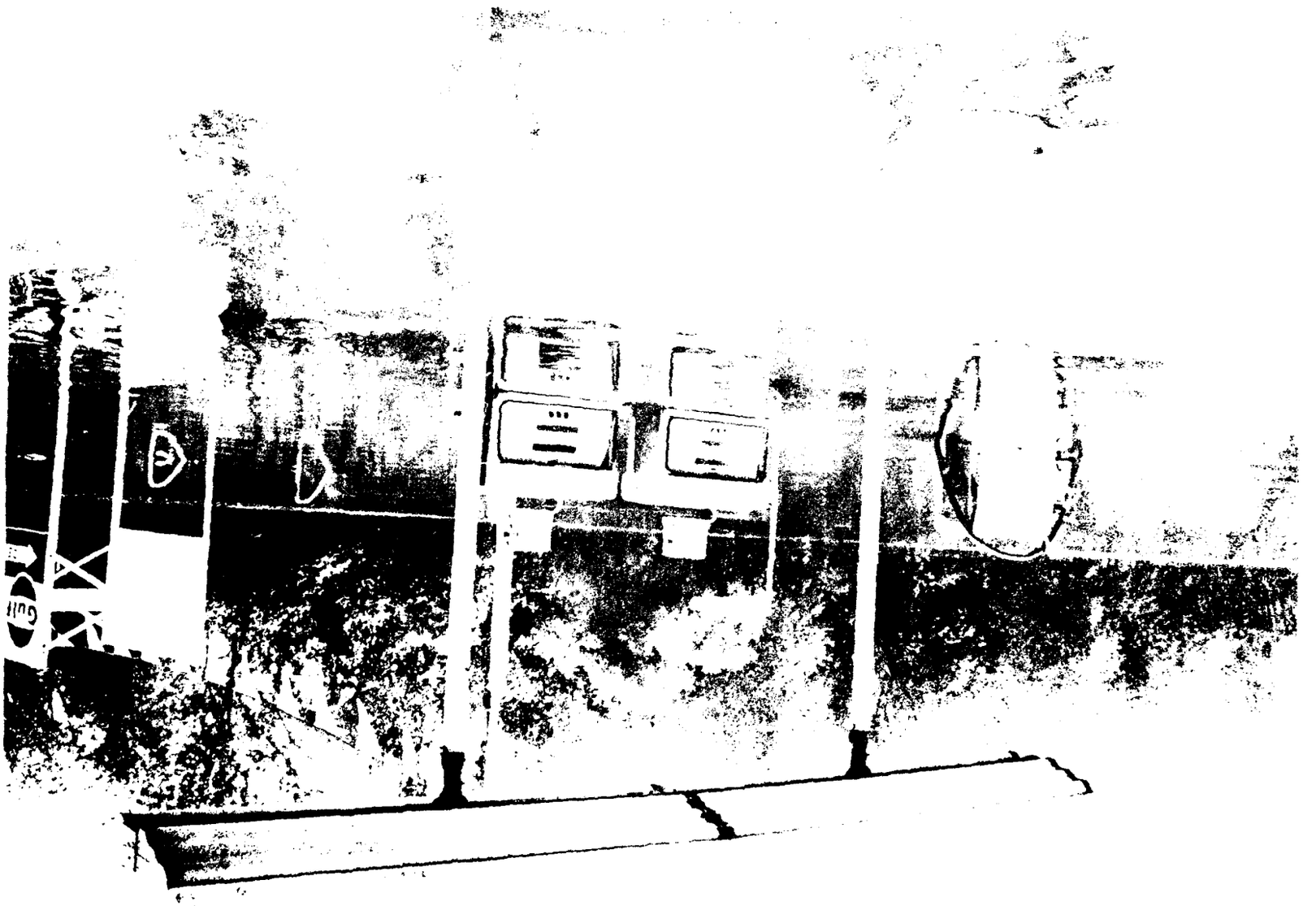
Table 29. - Estimated Non-agricultural Damages in the Oswego River Basin

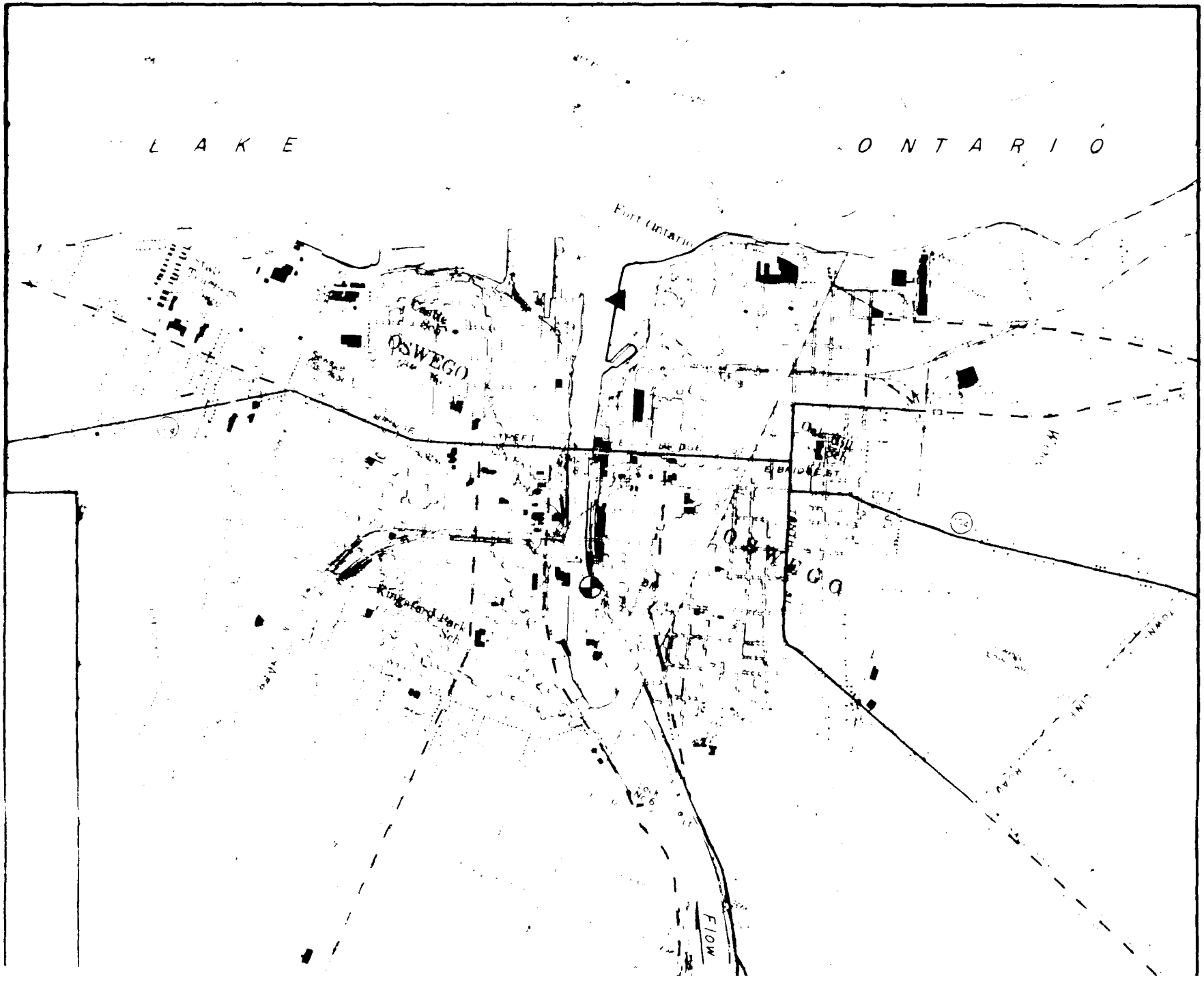
Reach	June 1972 Flood Damage (1)			Total
	Residential	Commercial	Public & Others	
	$	$	$	$
1-A	3,000	9,000	2,000	14,000
1	5,000	(2)	1,000	6,000
2	2,000	31,000	(2)	33,000
3	88,000	63,000	(2)	151,000
4	(2)	(2)	(2)	(2)
5	9,000	1,000	6,000	16,000
6	32,000	41,000	6,000	79,000
7	56,000	62,000	8,000	126,000
8	285,000	53,000	27,000	365,000
9	66,000	20,000	8,000	94,000
10	75,000	(2)	(2)	75,000
11	(2)	(2)	1,000	1,000
12	170,000	94,000	46,000	310,000
13	28,000	(2)	4,000	32,000
14	37,000	(2)	1,000	38,000
15	(2)	14,000	36,000	50,000
16	7,000	60,000	35,000	102,000
17	29,000	(2)	291,000	320,000
18	(2)	(2)	2,000	2,000
19	1,000	(2)	(2)	1,000
20	4,000	(2)	(2)	4,000
21	(2)	(2)	8,000	8,000
22	17,000	5,000	42,000	64,000
23	(2)	(2)	(2)	(2)
24	(2)	(2)	(2)	(2)
25	(2)	(2)	(2)	(2)
26	17,000	(2)	5,000	22,000
27	22,000	(2)	9,000	31,000
28	(2)	(2)	7,000	7,000
29	6,000	158,000	1,000	165,000
TOTAL	959,000	611,000	546,000	2,116,000

(1) Does not include hillside or tributary damage.
(2) Assumed to be negligible.

Figure 38 Flooding along Hayes Road between Red Rock and Cold Springs on the Seneca River.

[illegible] flood waters from the Seneca River.

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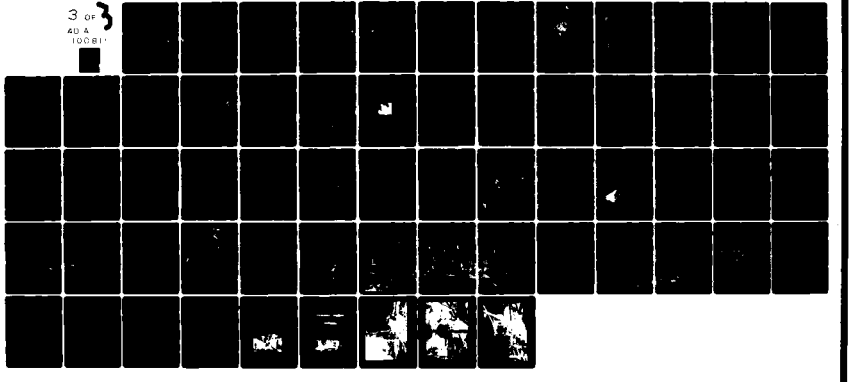

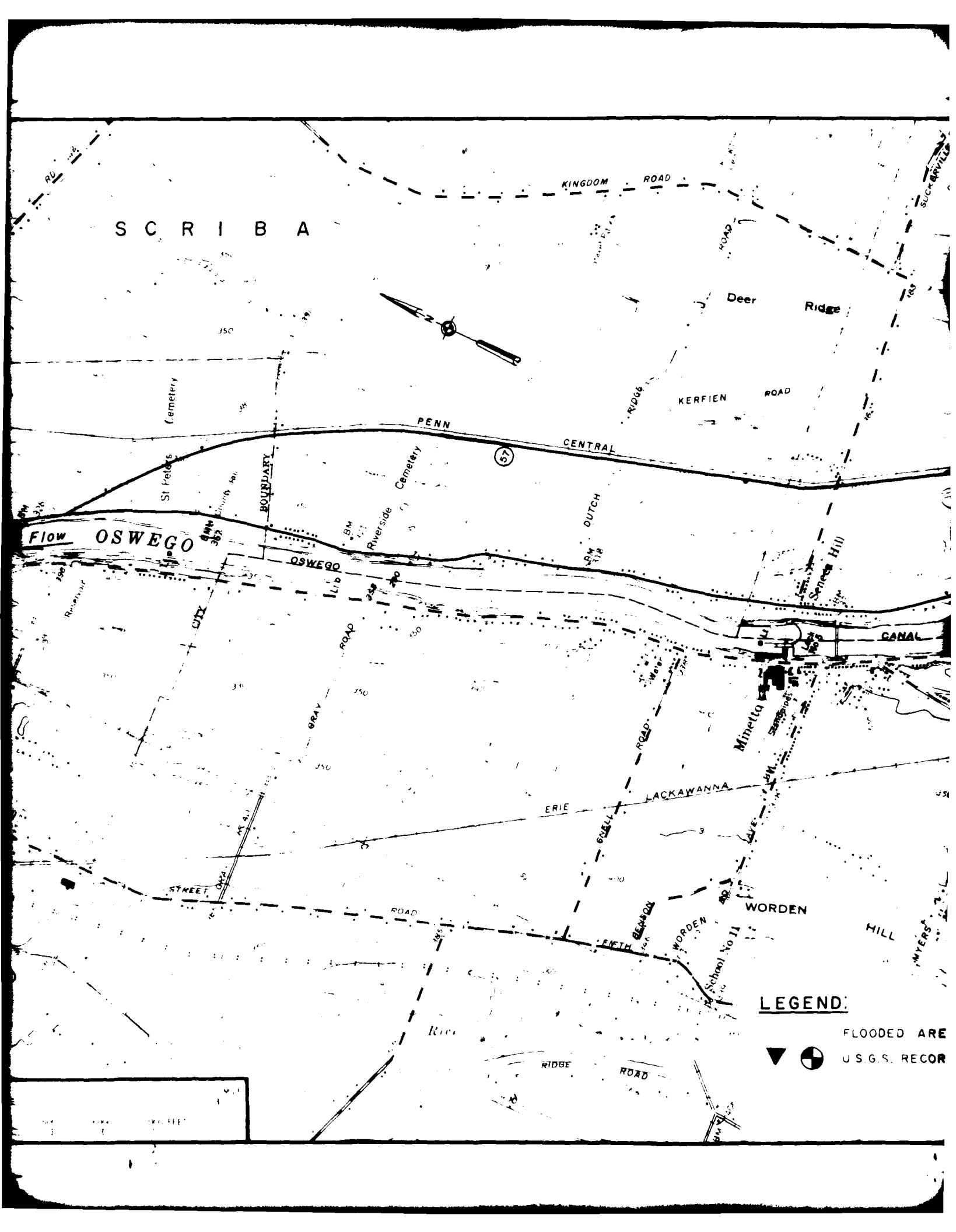
SCRIBA
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KERFIEN ROAD
RIDGE
PENN CENTRAL
57
Cemetery
St Peters
BOUNDARY
Riverside Cemetery
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OUTCH
Flow OSWEGO
OSWEGO
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CITY
ROAD
GRAY
Seneca Hill
CANAL
Minetto
ROAD
ERIE LACKAWANNA
ERIE
GOWELL
STREET
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FIFTH
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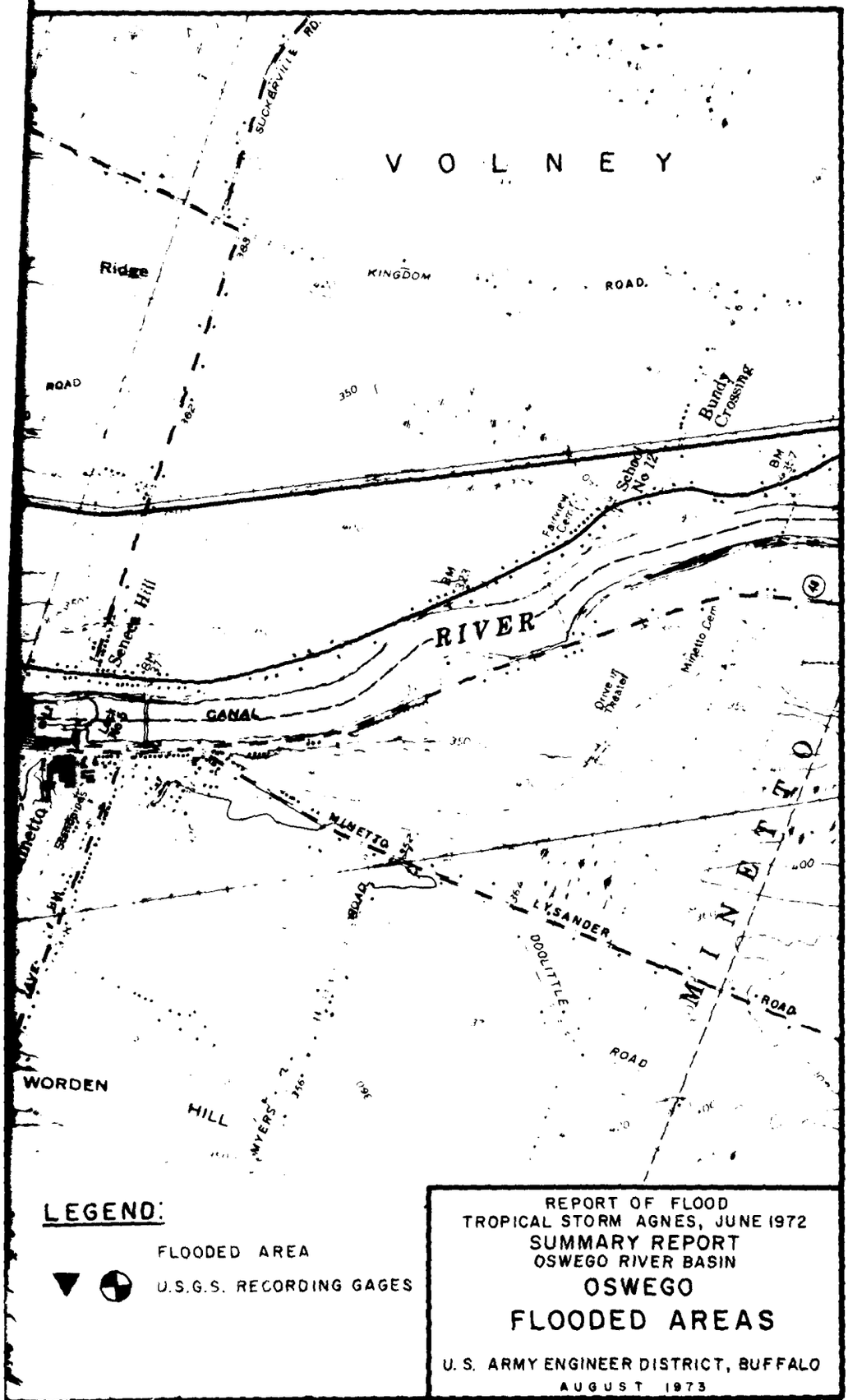

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FLOODED AREA

U.S.G.S. RECORDING GAGES

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OSWEGO
FLOODED AREAS

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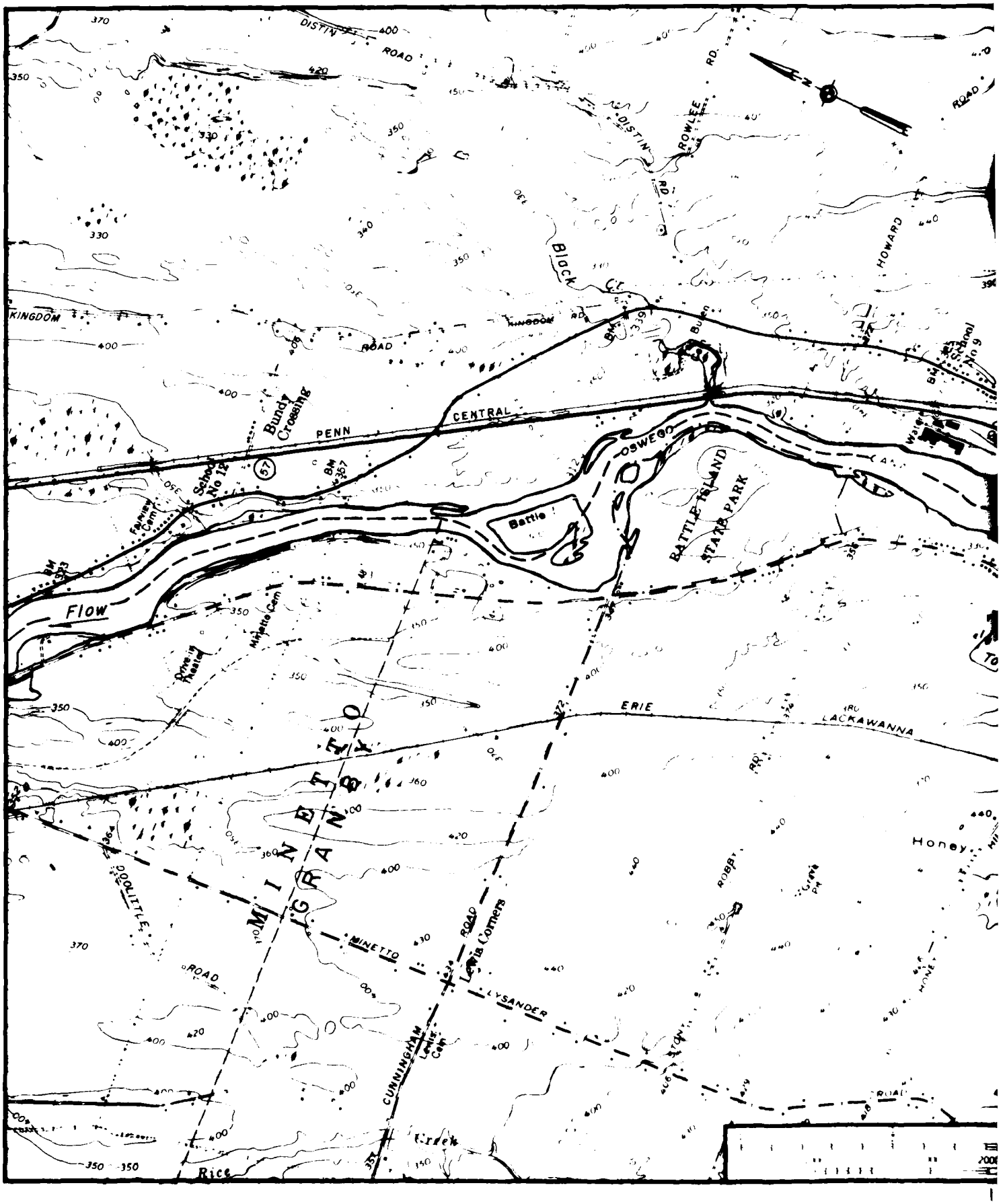
AUGUST 1973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Battle
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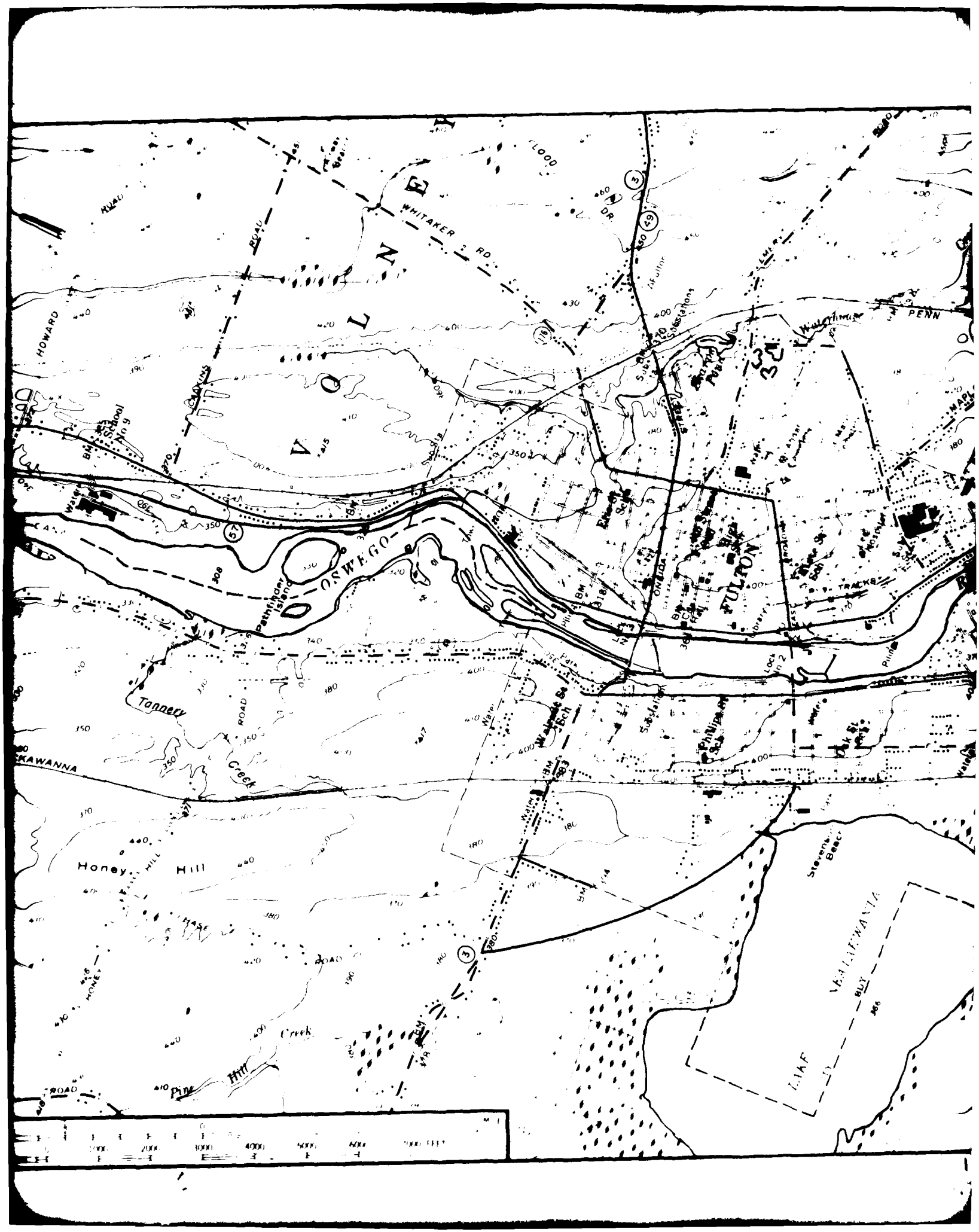
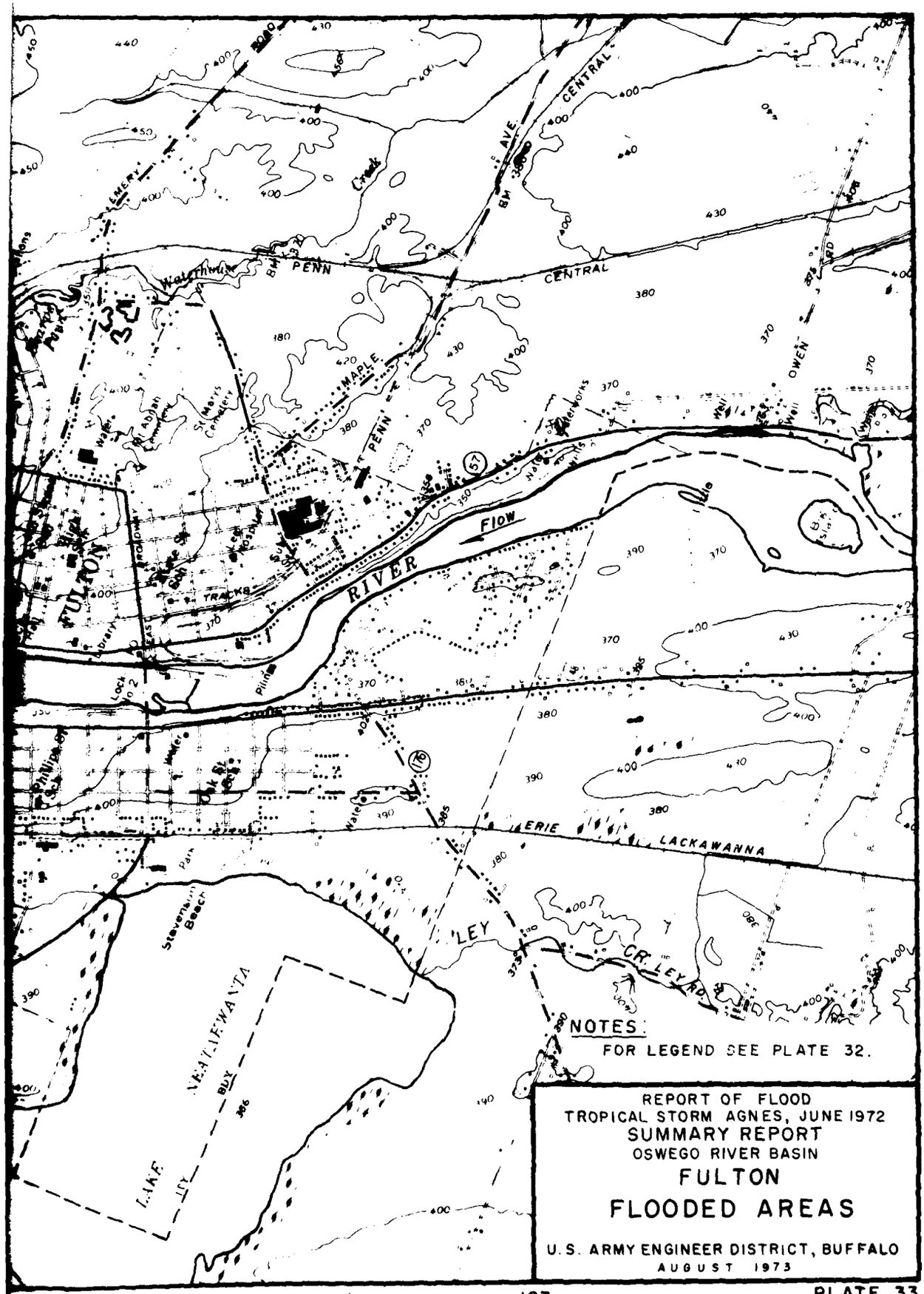
Flow
ERIE
LACKAWANNA
MINETTO
Lewis Corners
ROAD
LYSANDER
CUNNINGHAM
Rice
Honey


OSWEGO
FULTON
Pathfinder Island
Tannery
Creek
Honey Hill
Pine Hill
Creek
WHITAKER RD.
HOWARD
PENN
ONEIDA
Elliott St.
Water St.
Phillips St.
Lock No 2
Stevens Beach
Maple Ave
Subdivision
Sub Station
Water Tech
Pump House
Park
Tracks
Canal
Bridge
Road
Drive
Lane
Court
Place
Avenue
Street
Boulevard
Terrace
Circle
Alley
Trail
Path
Square
Plaza
Park
Garden
Gardens
Cemetery
Church
School
Hospital
Library
Museum
Theater
Hotel
Motel
Restaurant
Store
Shop
Market
Bank
Post Office
Police Station
Fire Station
Town Hall
City Hall
Courthouse
Jail
Prison
Factory
Mill
Warehouse
Dock
Pier
Wharf
Boat Ramp
Marina
Boat Launch
Beach
Swimming Pool
Golf Course
Tennis Court
Baseball Field
Football Field
Soccer Field
Basketball Court
Playground
Picnic Area
Campground
Trailer Park
Rest Area
Scenic Overlook
Historical Marker
Monument
Statue
Fountain
Clock Tower
Water Tower
Windmill
Lighthouse
Radio Tower
Cell Tower
Antenna
Satellite Dish
Solar Panel
Wind Turbine
Power Line
Transformer
Substation
Pipeline
Gas Station
Oil Well
Mine
Quarry
Gravel Pit
Landfill
Dump
Recycling Center
Transfer Station
Incinerator
Sewage Treatment Plant
Water Treatment Plant
Reservoir
Dam
Levee
Canal
Ditch
Culvert
Bridge
Tunnel
Overpass
Underpass
Interchange
Ramp
Toll Booth
Weigh Station
Rest Area
Scenic Overlook
Historical Marker
Monument
Statue
Fountain
Clock Tower
Water Tower
Windmill
Lighthouse
Radio Tower
Cell Tower
Antenna
Satellite Dish
Solar Panel
Wind Turbine
Power Line
Transformer
Substation
Pipeline
Gas Station
Oil Well
Mine
Quarry
Gravel Pit
Landfill
Dump
Recycling Center
Transfer Station
Incinerator
Sewage Treatment Plant
Water Treatment Plant
Reservoir
Dam
Levee
Canal
Ditch
Culvert
Bridge
Tunnel
Overpass
Underpass
Interchange
Ramp
Toll Booth
Weigh Station



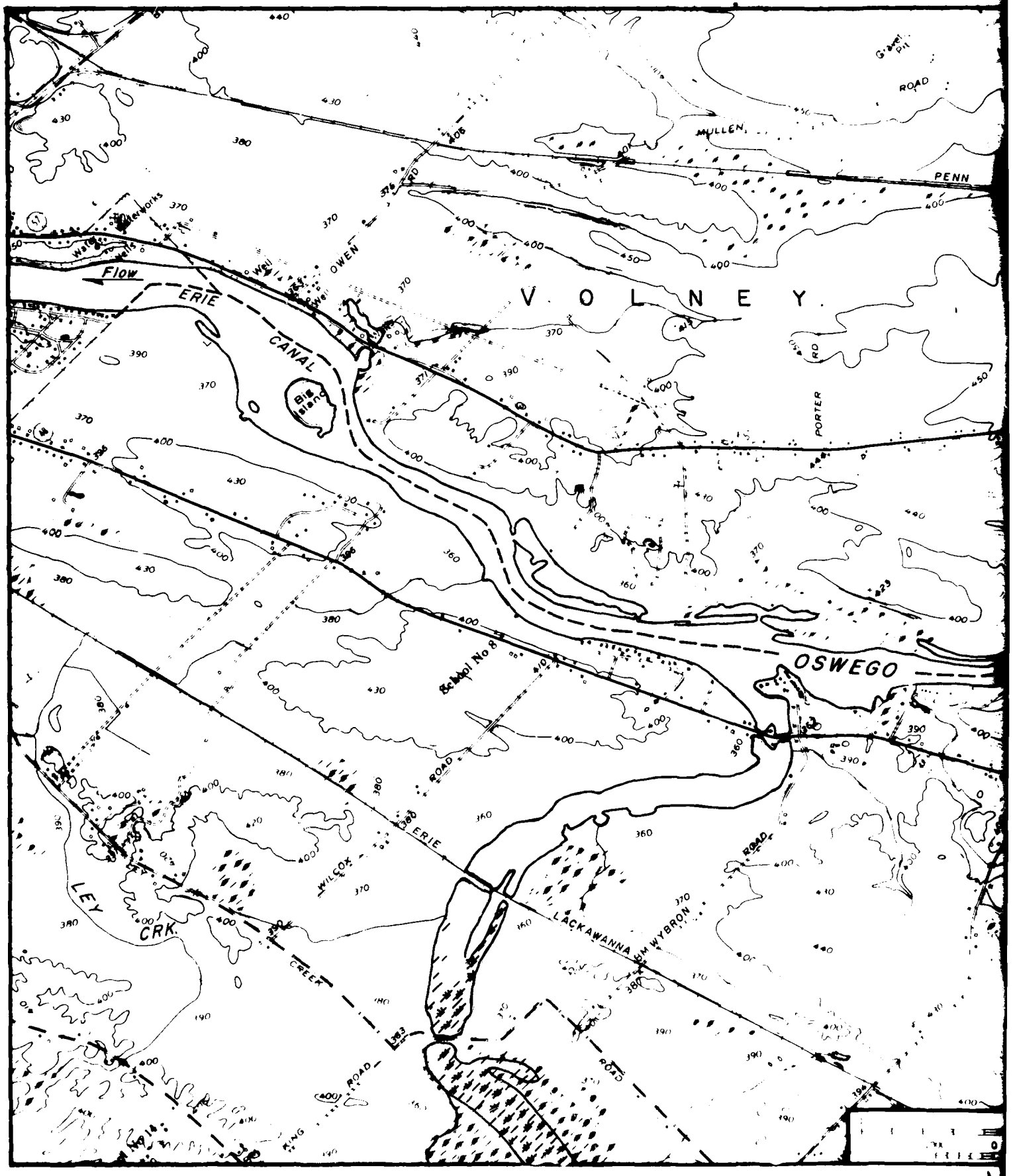
NOTES:

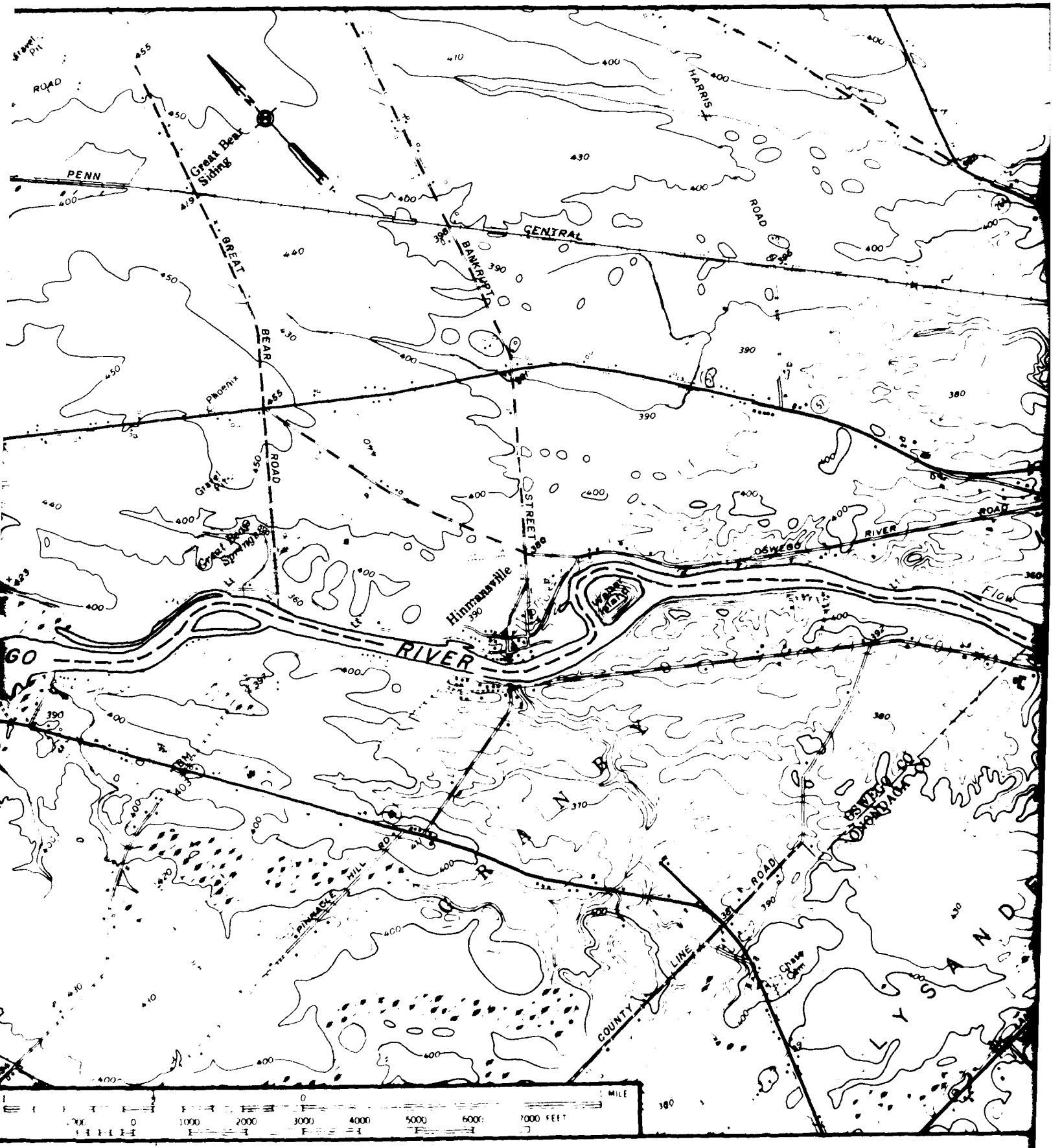
FOR LEGEND SEE PLATE 32.

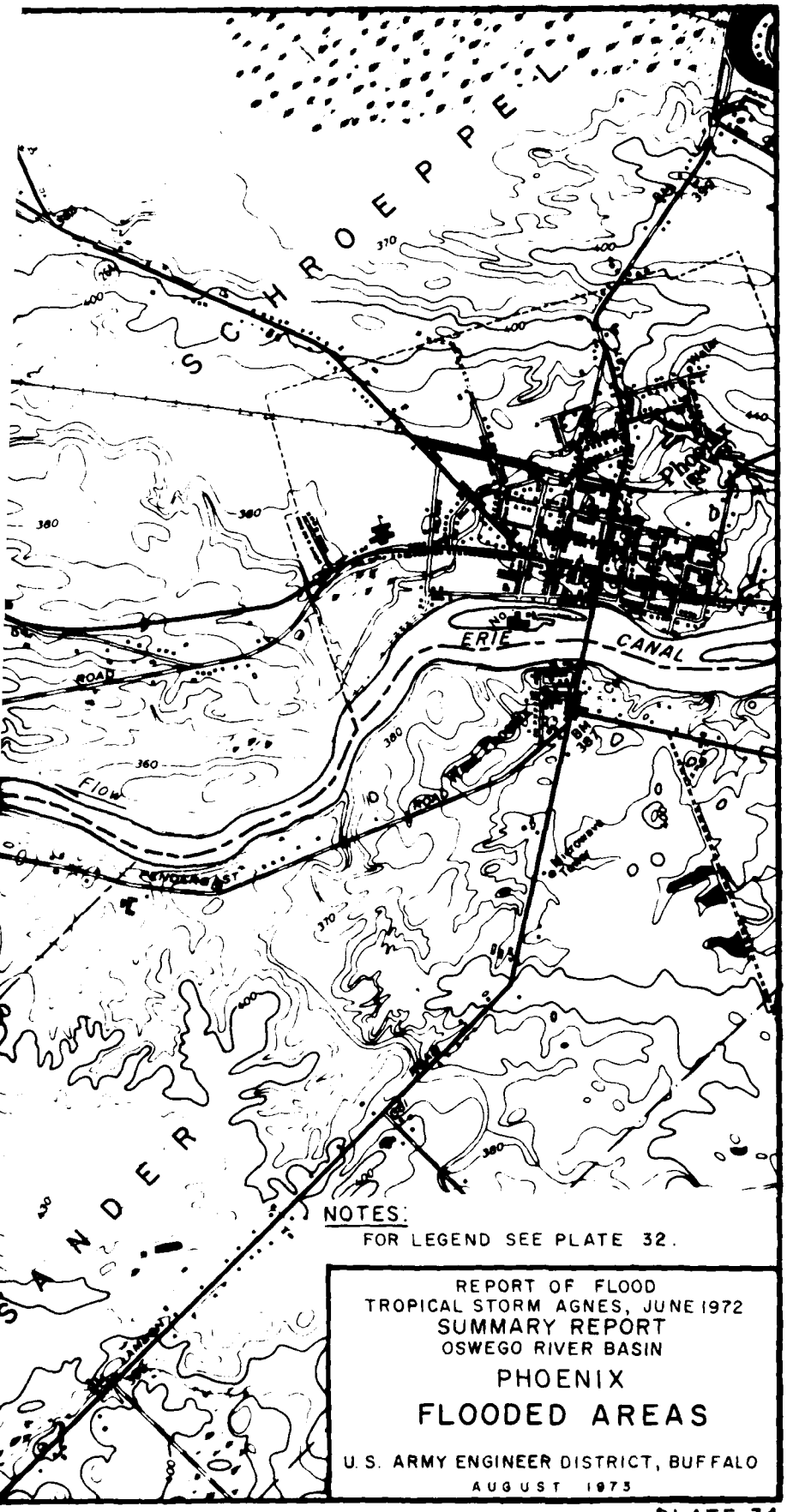
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN

FULTON
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973


V O L N E Y
ERIE CANAL
Flow
OWEN
MULLEN
PENN
ROAD
PORTER RD
OSWEGO
ERIE
ROAD
WILCOX
LEY CRK.
CREEK
LACKAWANNA & WYBRON
ROAD
KING ROAD
Big Island
Gravel pit
Waterworks
Well
Well
Sch. Dist. No 8


Great Bear Siding
PENN
CENTRAL
ROAD
BEAR
BANKRUPT
HARRIS
Phoenix
Gravel Pit
Great Bear Spring
STREET
Hinmansville
RIVER
OSWEGO
RIVER ROAD
FLOW
PINNACLE HILL ROAD
COUNTY LINE
ROAD
Cross Cem
MILE
FEET
0
1000
2000
3000
4000
5000
6000
7000



NOTES:

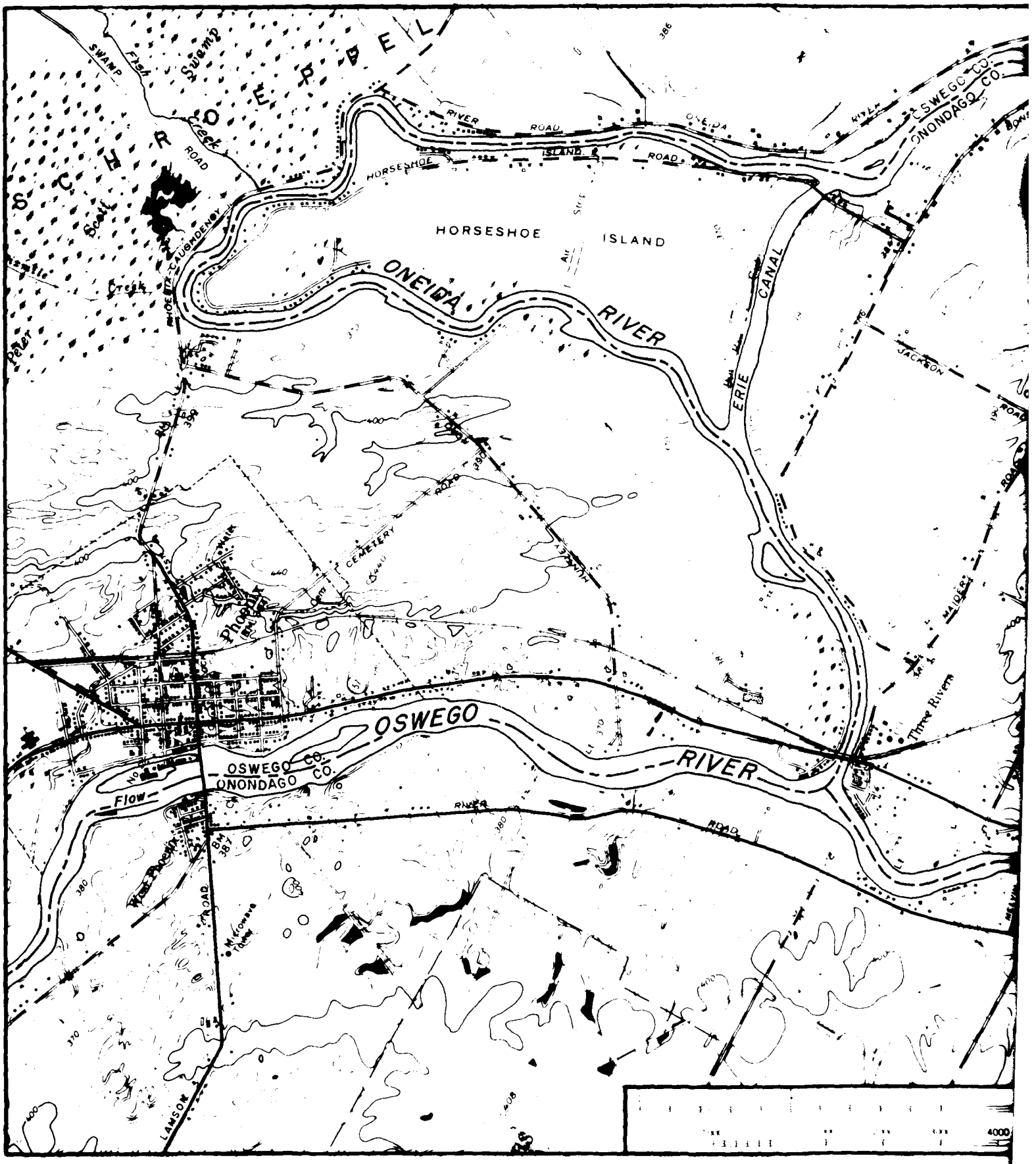
FOR LEGEND SEE PLATE 32.

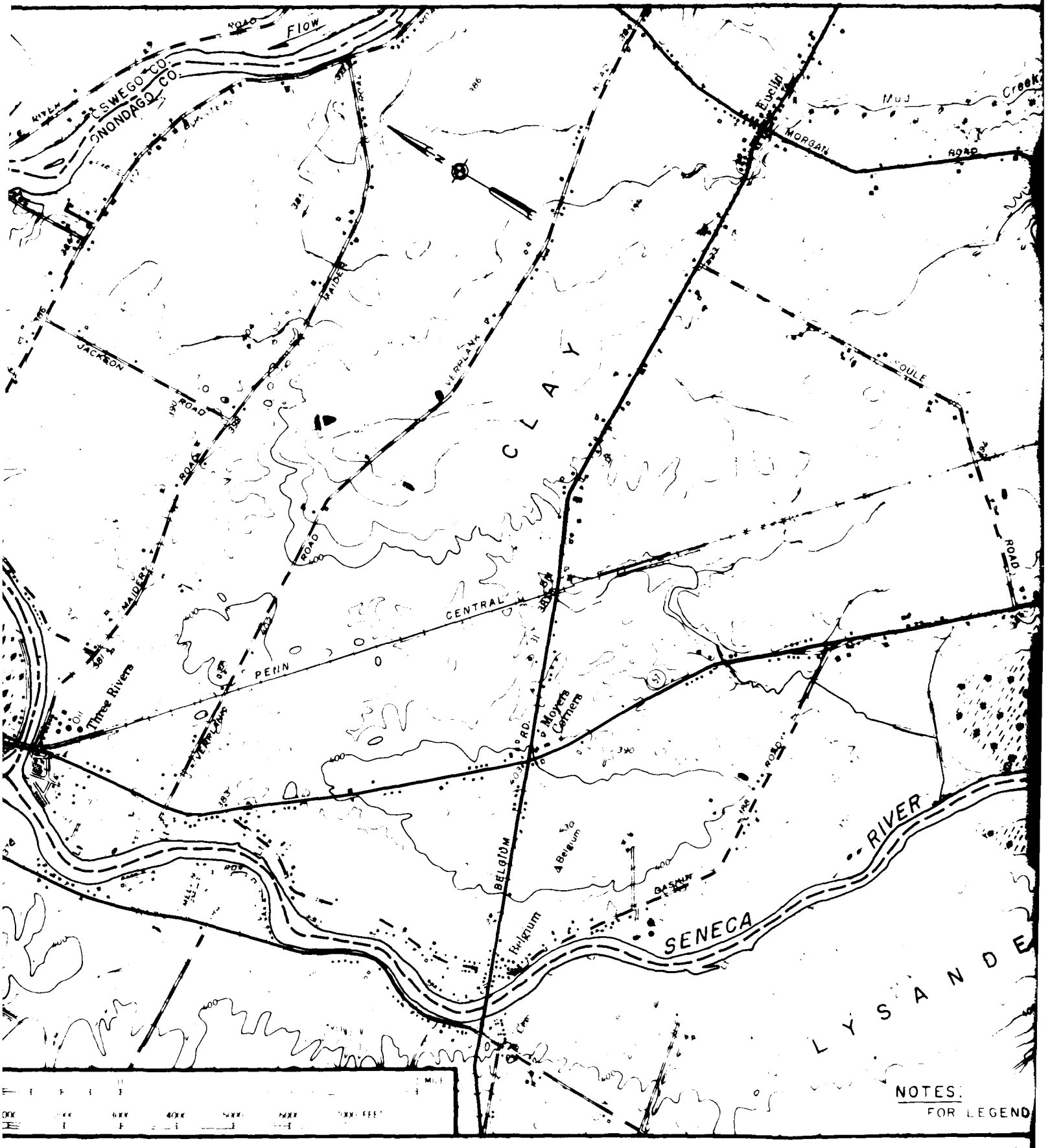
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN

PHOENIX

FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

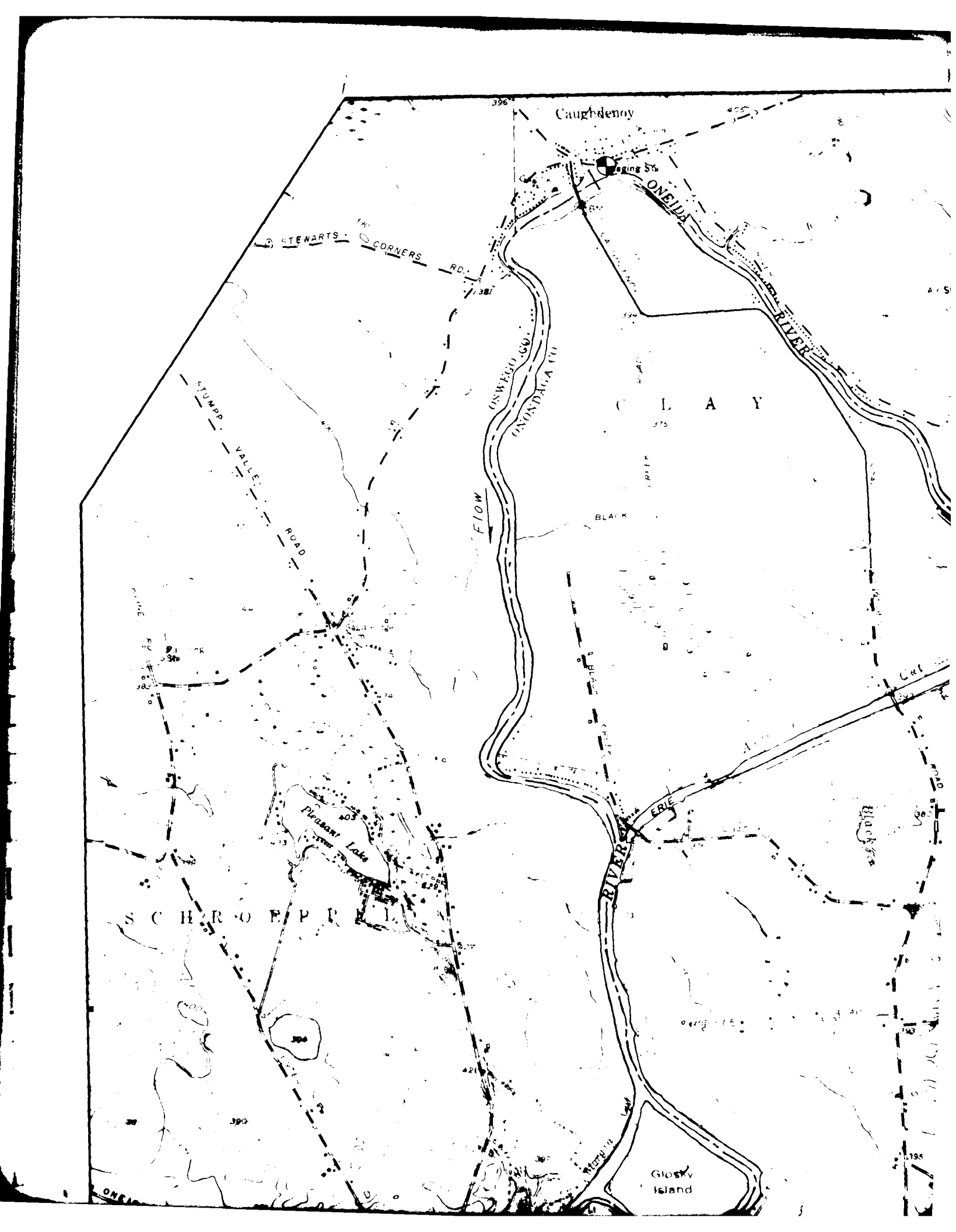

SCHEPPEL
Swamp
Fish
Creek
ROAD
RIVER
ROAD
ONEIDA
ISLAND
ROAD
HORSESHOE
OSWEGO CO.
ONONDAGO CO.
HORSESHOE ISLAND
Scott
Creek
CAUGHDENOY
ONEIDA RIVER
ERIE CANAL
JACKSON
CEMETERY
MAIN
Phoenix
OSWEGO
RIVER
OSWEGO CO.
ONONDAGO CO.
Flow
RIVER
ROAD
Three Rivers
West Phoenix
ROAD
McCowans
Tavern
LAMSON
4000

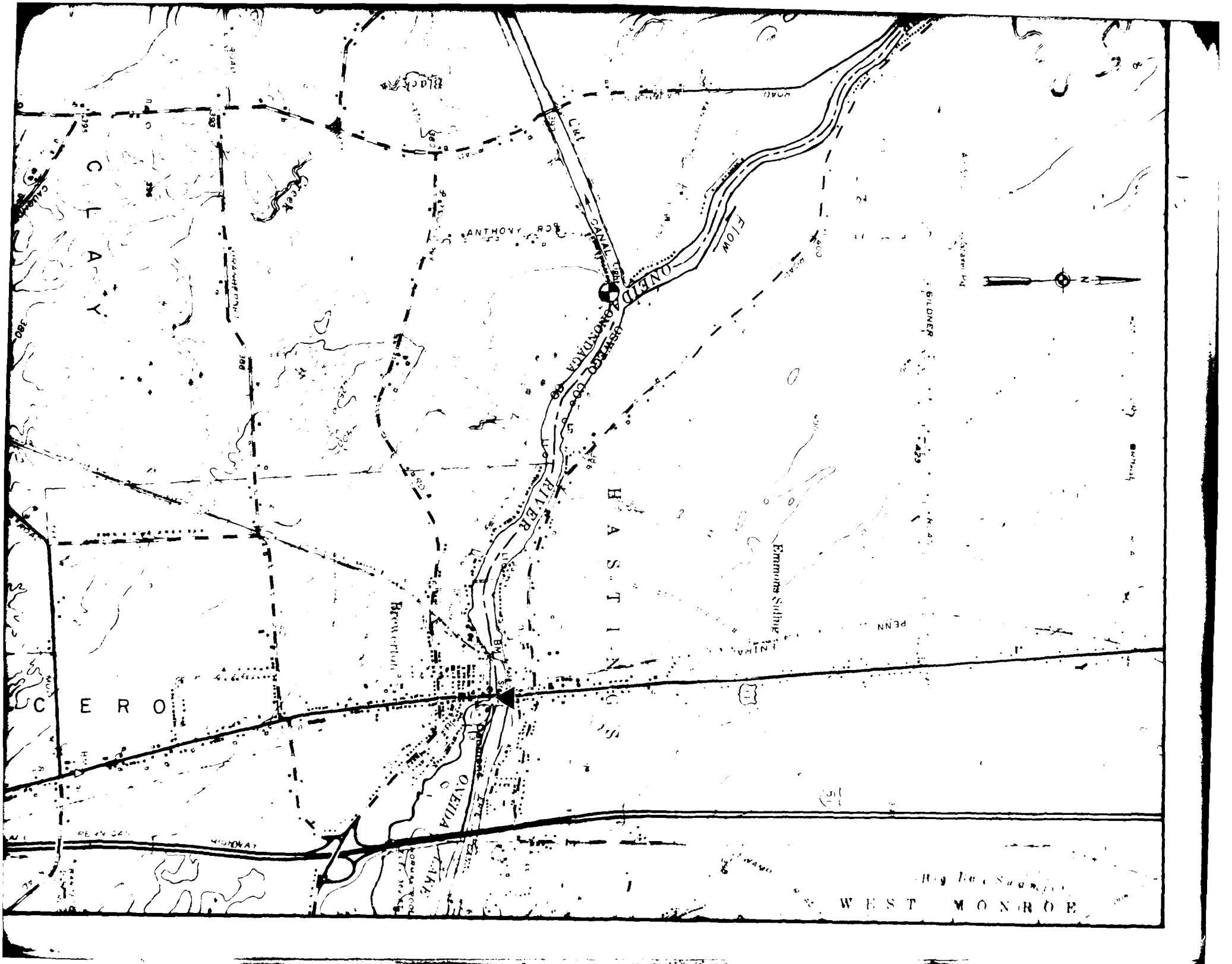

OSWEGO CO.
ONONDAGA CO.
FLOW
Mud Creek
MORGAN ROAD
CLAY
JACKSON ROAD
WARNERS ROAD
WARNERS ROAD
CENTRAL
PENN
Three Rivers
Moyers Corners
BELGIUM RD.
Belgium
SENECA RIVER
LYSANDER
NOTES:
FOR LEGEND

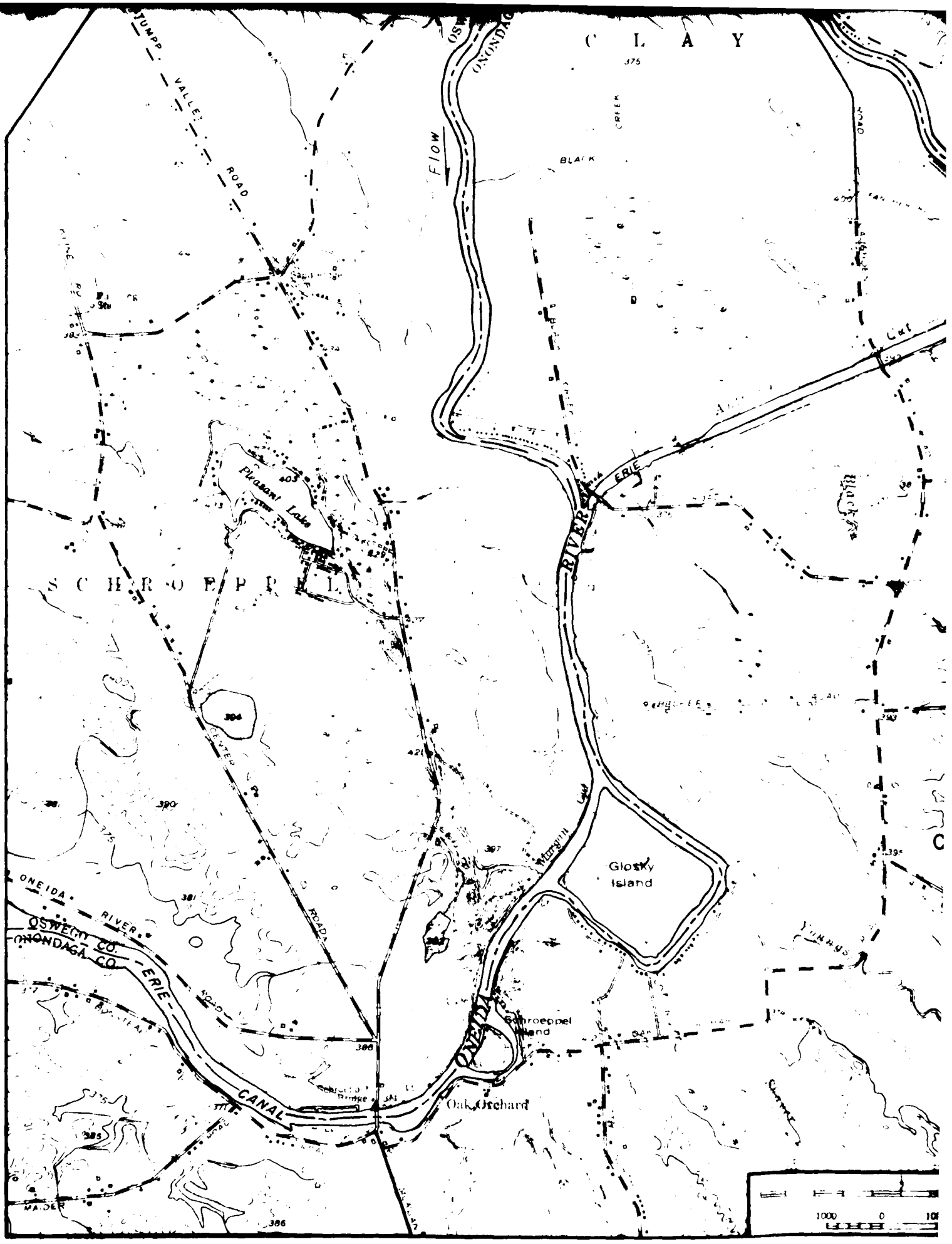
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN
THREE RIVERS
FLOODED AREAS

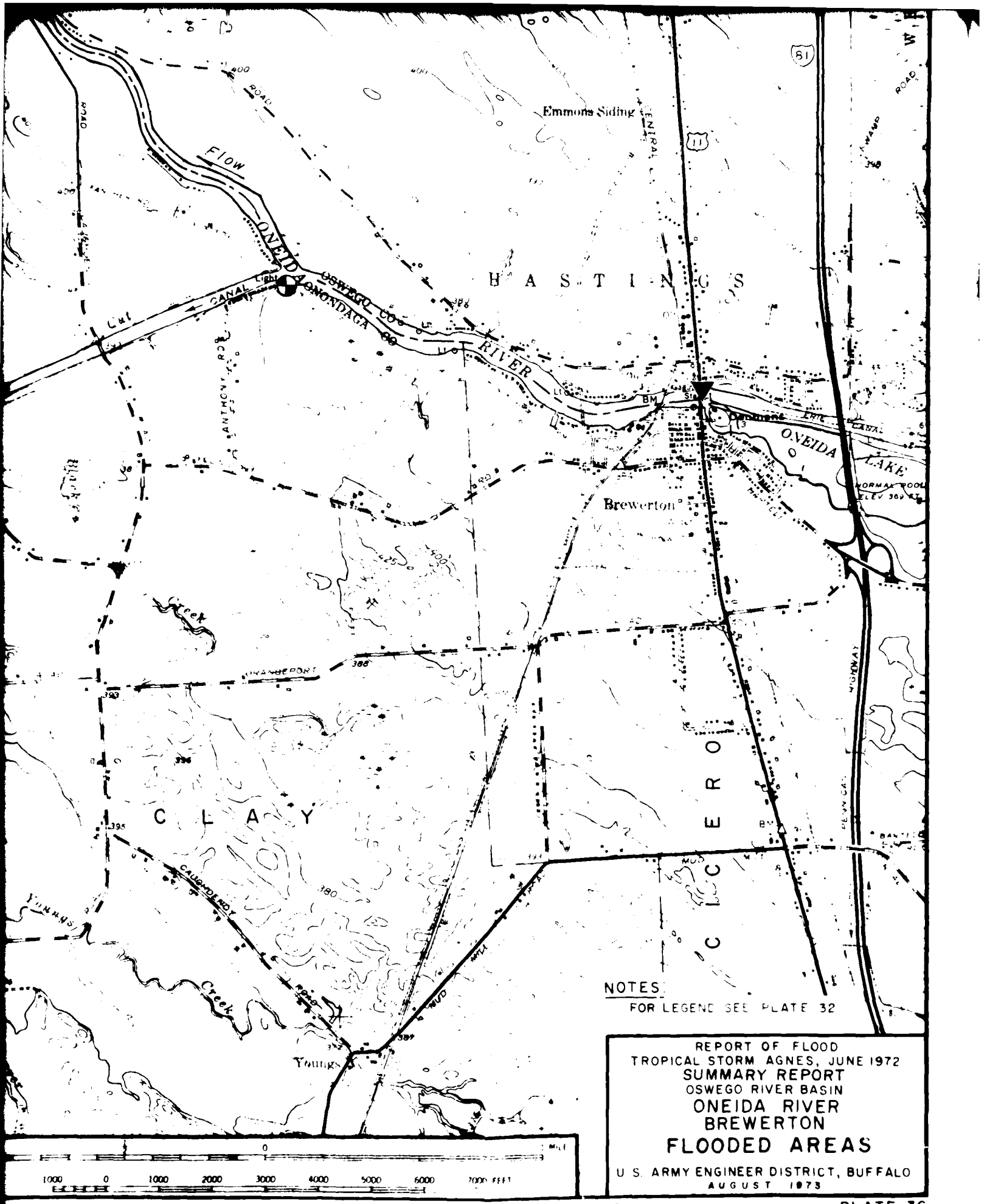
U. S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

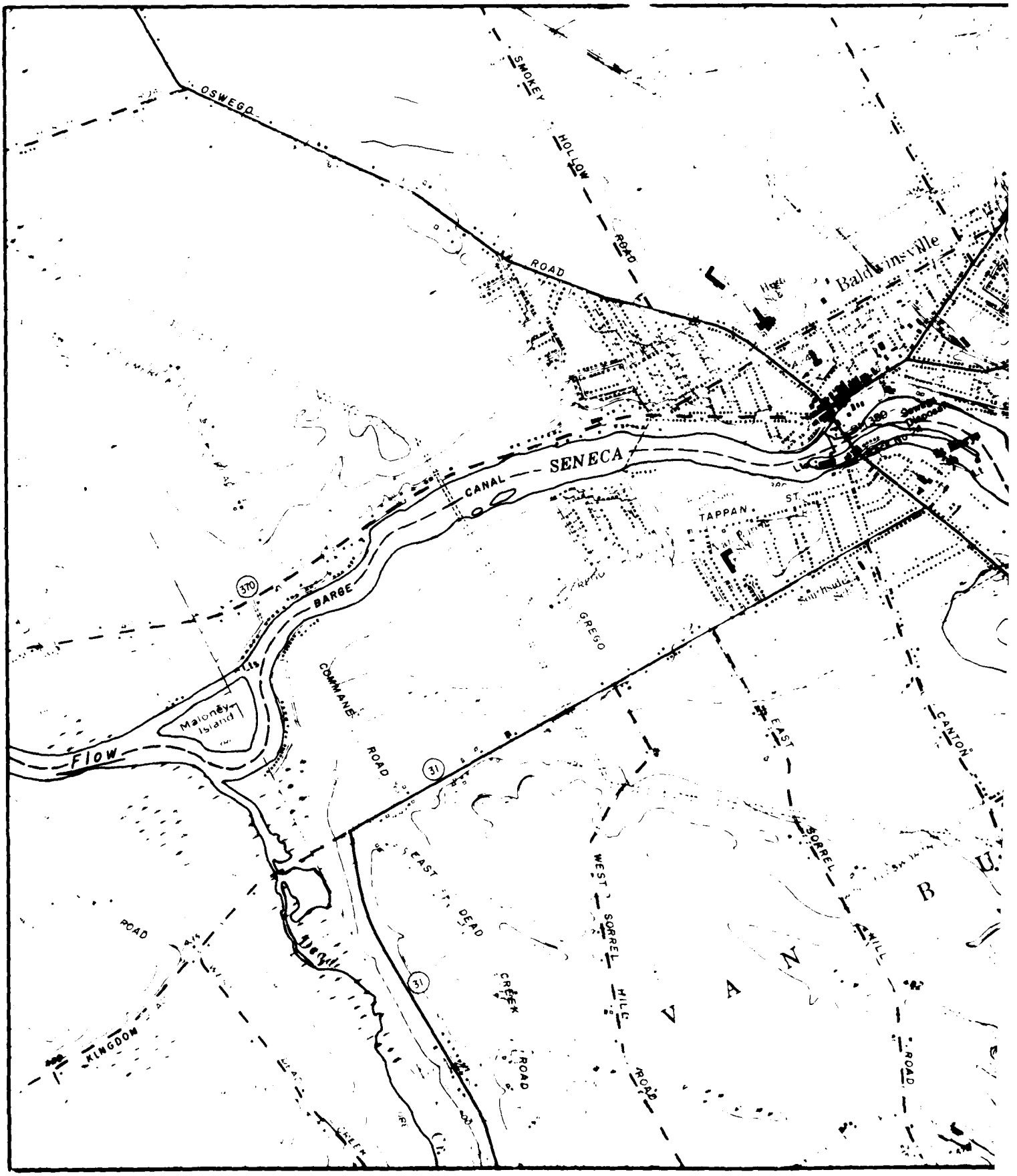
NOTES:
FOR LEGEND SEE PLATE 32.


Caughdenoy
STEWARTS CORNERS RD.
ONEIDA RIVER
OSWEGO CO.
ONONDAGA CO.
C L A Y
STUMPP VALLEY ROAD
FLOW
BLACK
Pleasant Lake
S C H R O E P P E L
ERIE
RIVER
Glosky Island

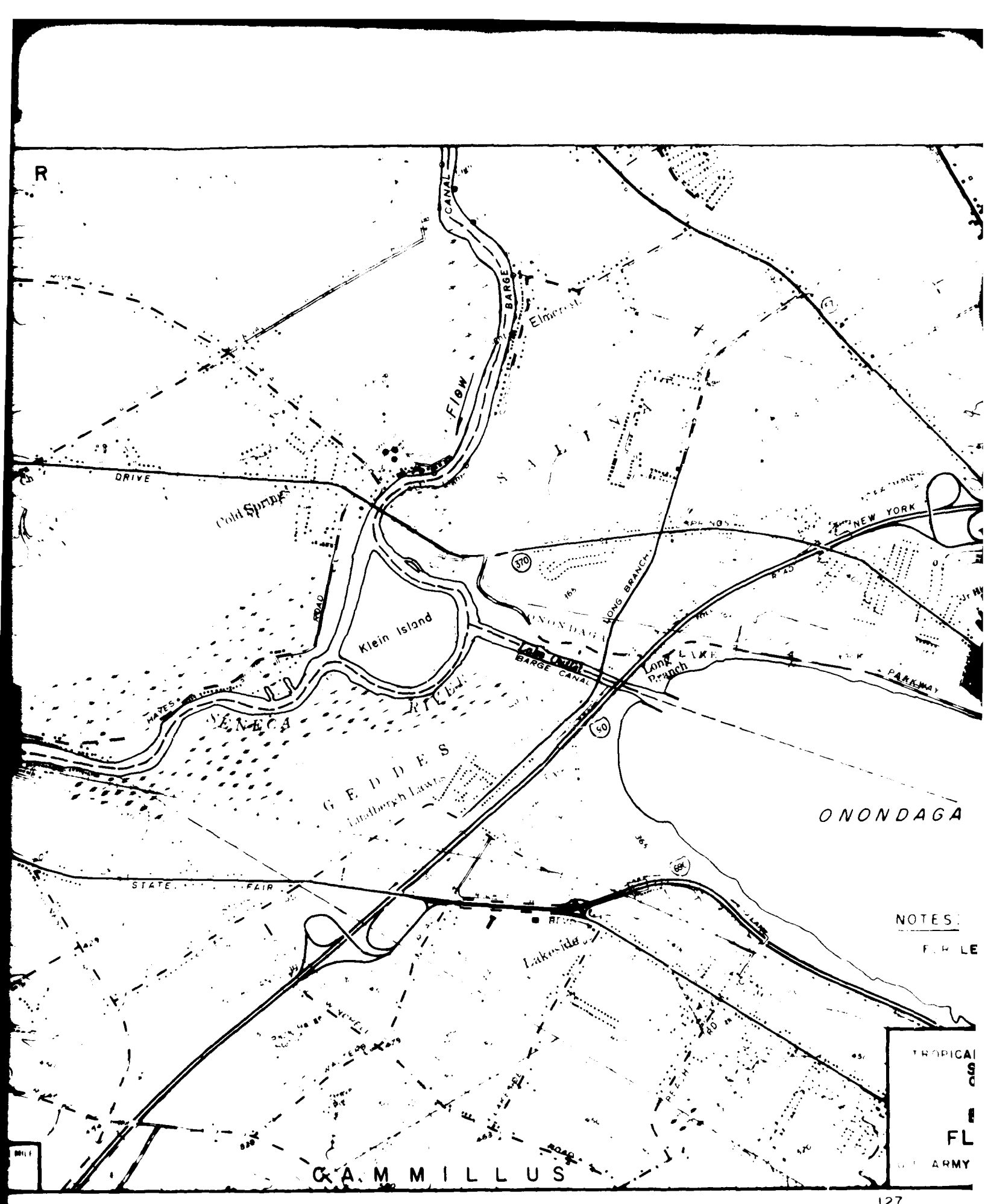

CLAY
CERO
HASTINGS
ONEIDA
ONONDAGA CO.
OSWEGO CO.
RIVER
CANAL
ANTHONY RD
BLOCH
ELLIOTT
BILONER
Emmons Siding
PENN
WEST MONROE

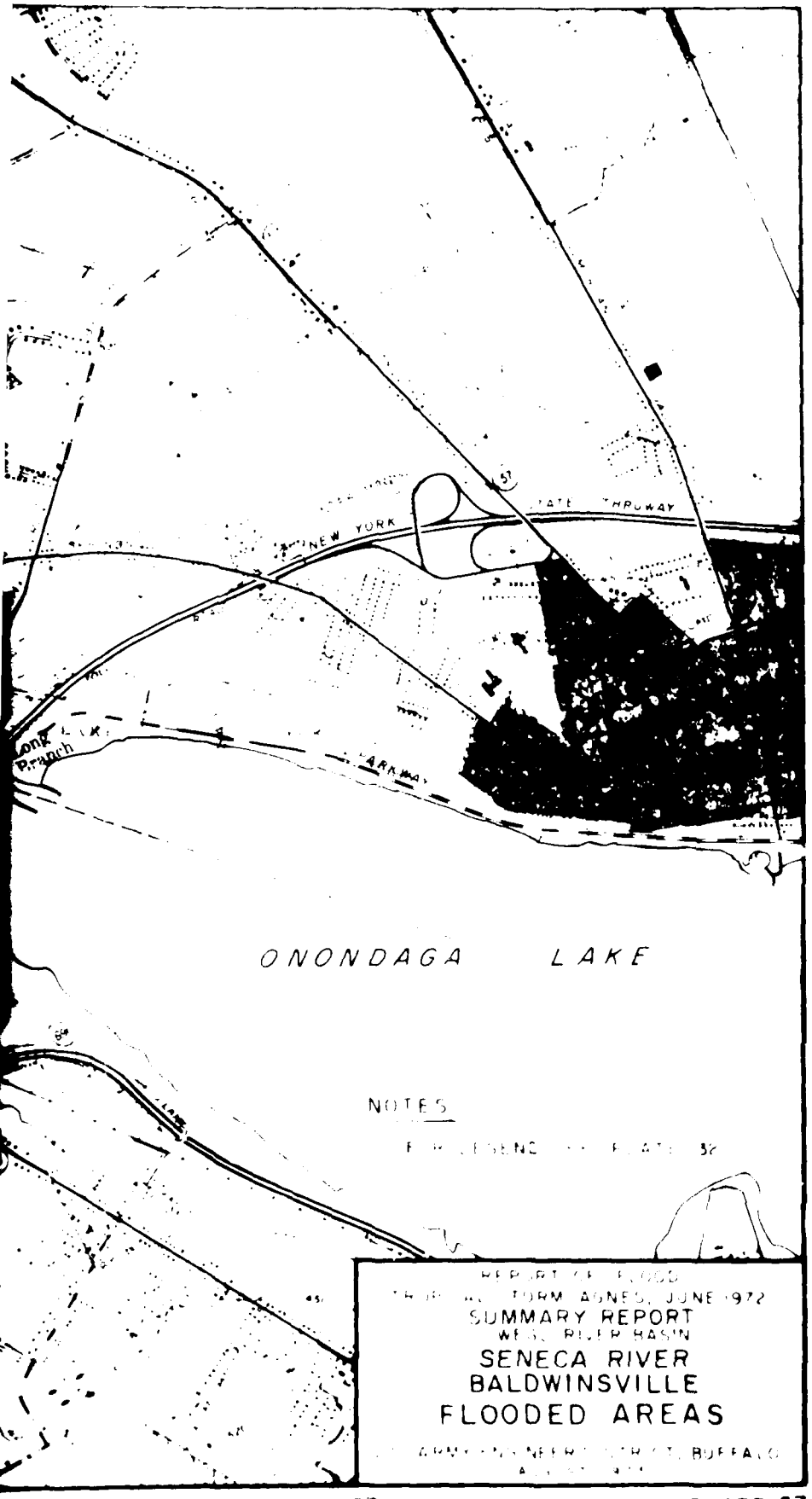

C L A Y
S C H R O E P P E L
TUMPP VALLEY ROAD
ONONDAGA
FLOW
BLACK CREEK
ROAD
Pleasant Lake
RIVER
ERIE
CANAL
Black
ONEIDA RIVER
OSWEGO CO.
ONONDAGA CO.
ERIE CANAL
ROAD
Glosky Island
Schroeppel Island
Oak Orchard
Schroeppel Bridge
MAIDER
1000
0


Emmons Siding
FLOW
ONEIDA
OSWEGO CO
ONONDAGA CO
CANAL
RIVER
HASTINGS
Brewerton
ONEIDA LAKE
CLAY
CICERO
Creek
Youngs
NOTES
FOR LEGEND SEE PLATE 32
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN
ONEIDA RIVER
BREWERTON
FLOODED AREAS
U. S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET


OSWEGO
ROAD
SMOKEY
HOLLOW
ROAD
Baldwinsville
SENECA
CANAL
TAPPAN
ST.
370
BARGE
FLOW
Maloney
Island
COMMANE
ROAD
31
GREGO
EAST
CANTON
SORREL
HILL
ROAD
WEST
SORREL
HILL
ROAD
EAST
DEAD
CREEK
ROAD
KINGDOM
ROAD
V A N
B U


L Y S A N D E R
BELGIUM
MEADOWBROOK
HICKS
ROAD
RIVER
ERIE
BARGE
CANAL
LACKAWANNA
HAYES
Red Rock
ROAD
CANTON
O'BRIEN
ROAD
Van Buren
ROAD
B U F F A L O


R
CANAL
BARGE
Elmcrest
Flow
DRIVE
Cold Spring
ROAD
Klein Island
Oswego
BARGE CANAL
LONG BRANCH
NEW YORK
ROAD
Long Lake
Branch
PARKWAY
HAYES
SENECA
G E D D E S
Lindbergh Lawn
ONONDAGA
STATE FAIR
Lakeside
NOTES:
TROPICAL
FL
ARMY
CAMMILLUS
127



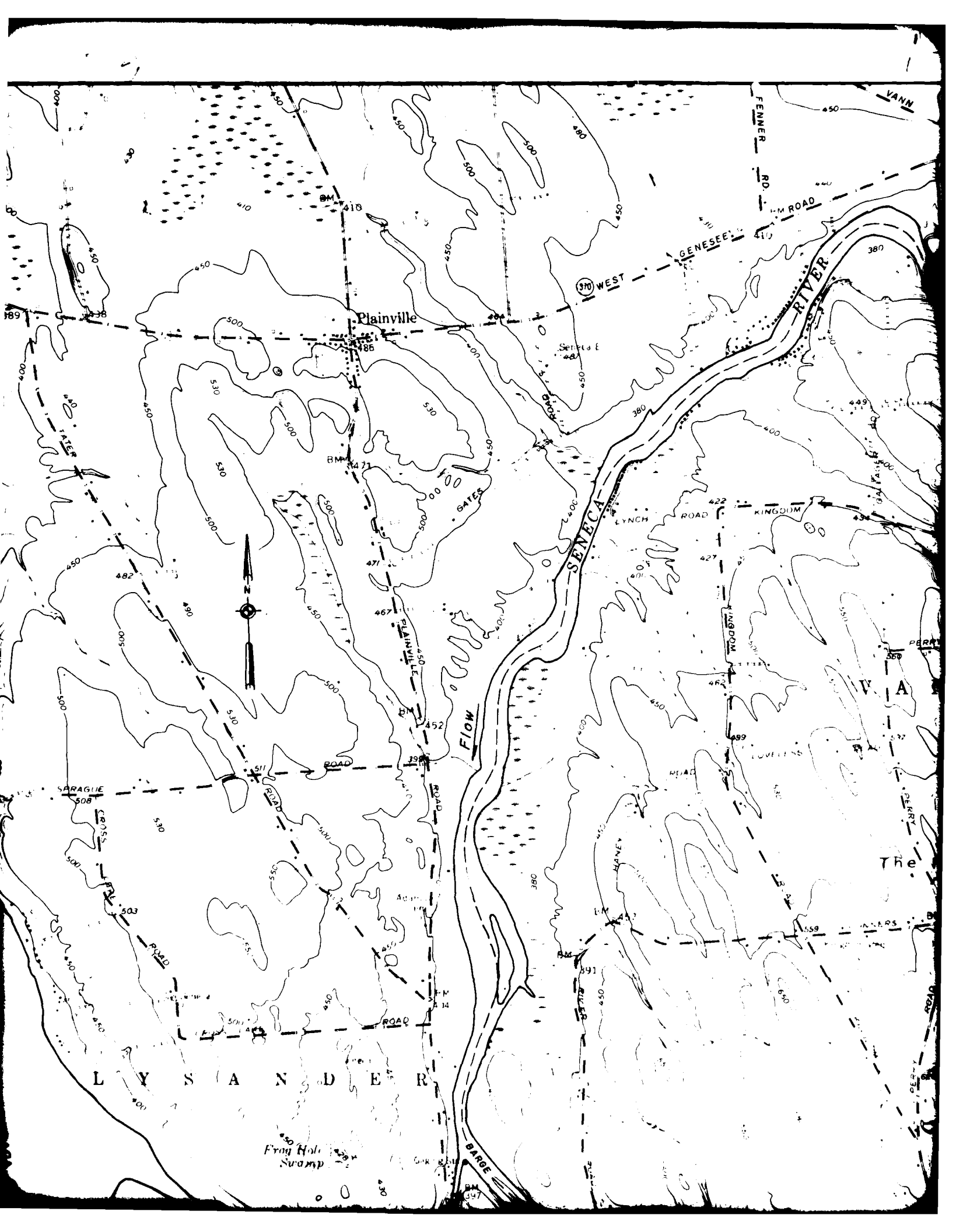
NOTES

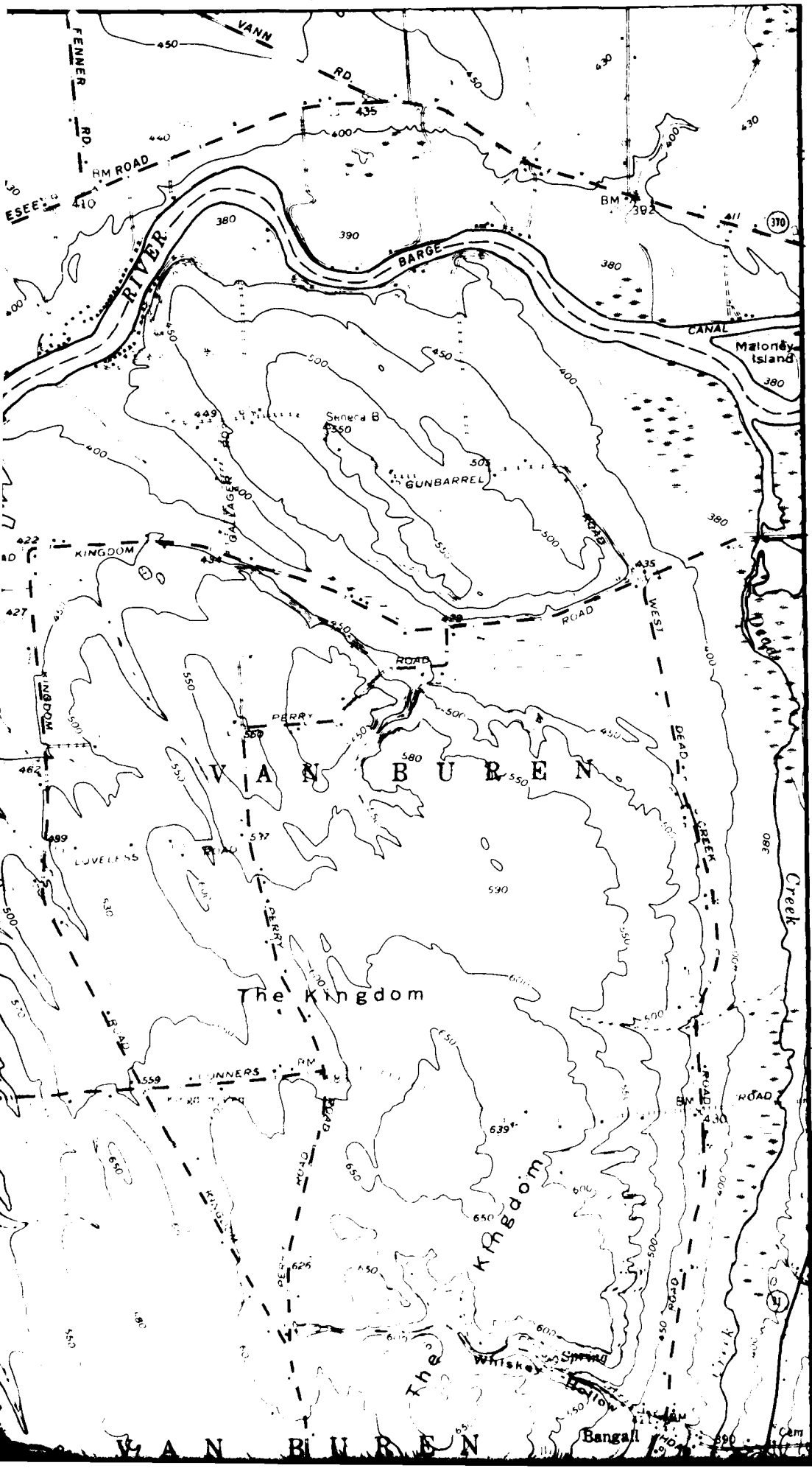
FOR LEGEND SEE PLATE 32

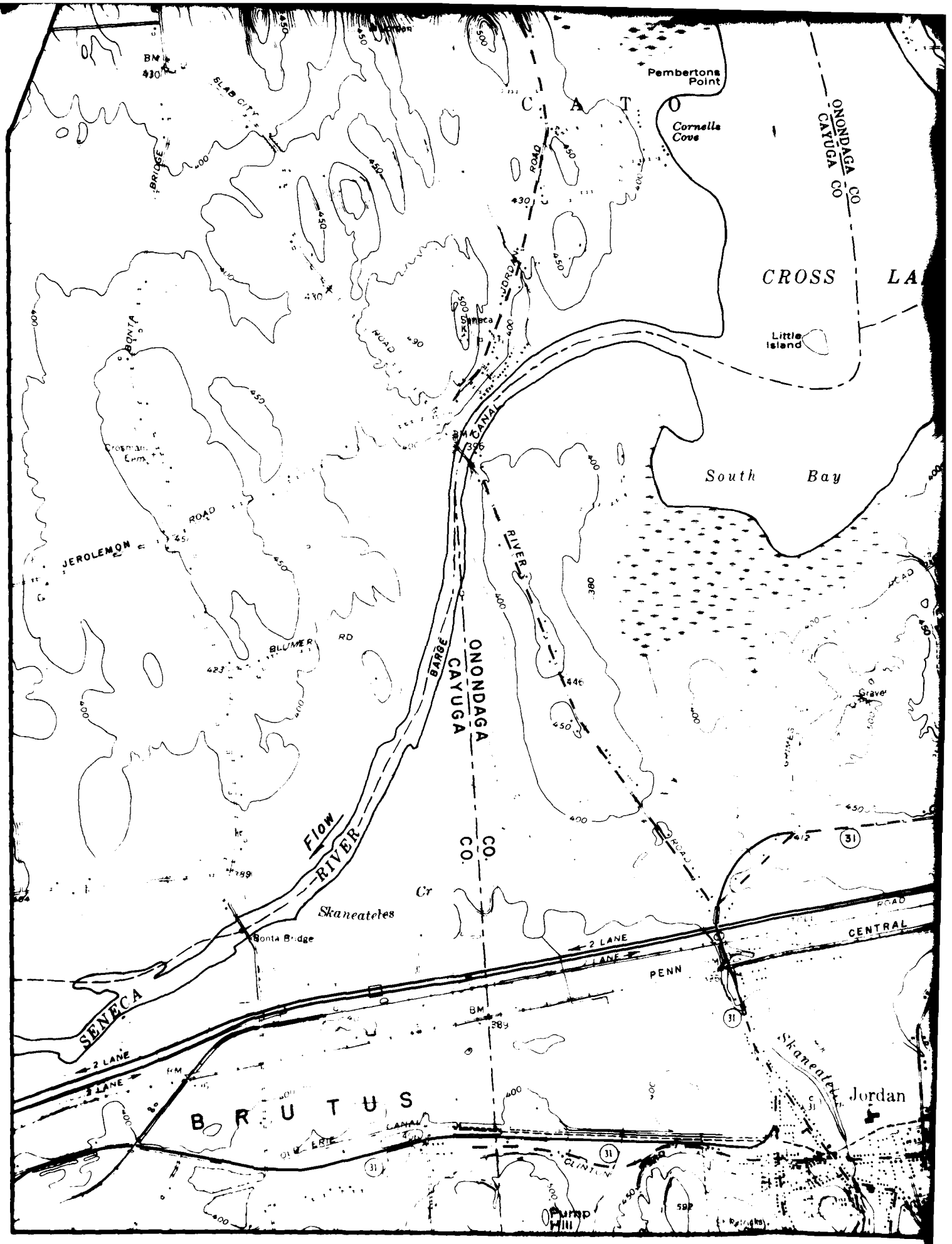
REPORT ON FLOOD
THROUGH STORM AGNES, JUNE 1972
SUMMARY REPORT
WEST RIVER BASIN
SENECA RIVER
BALDWINSVILLE
FLOODED AREAS

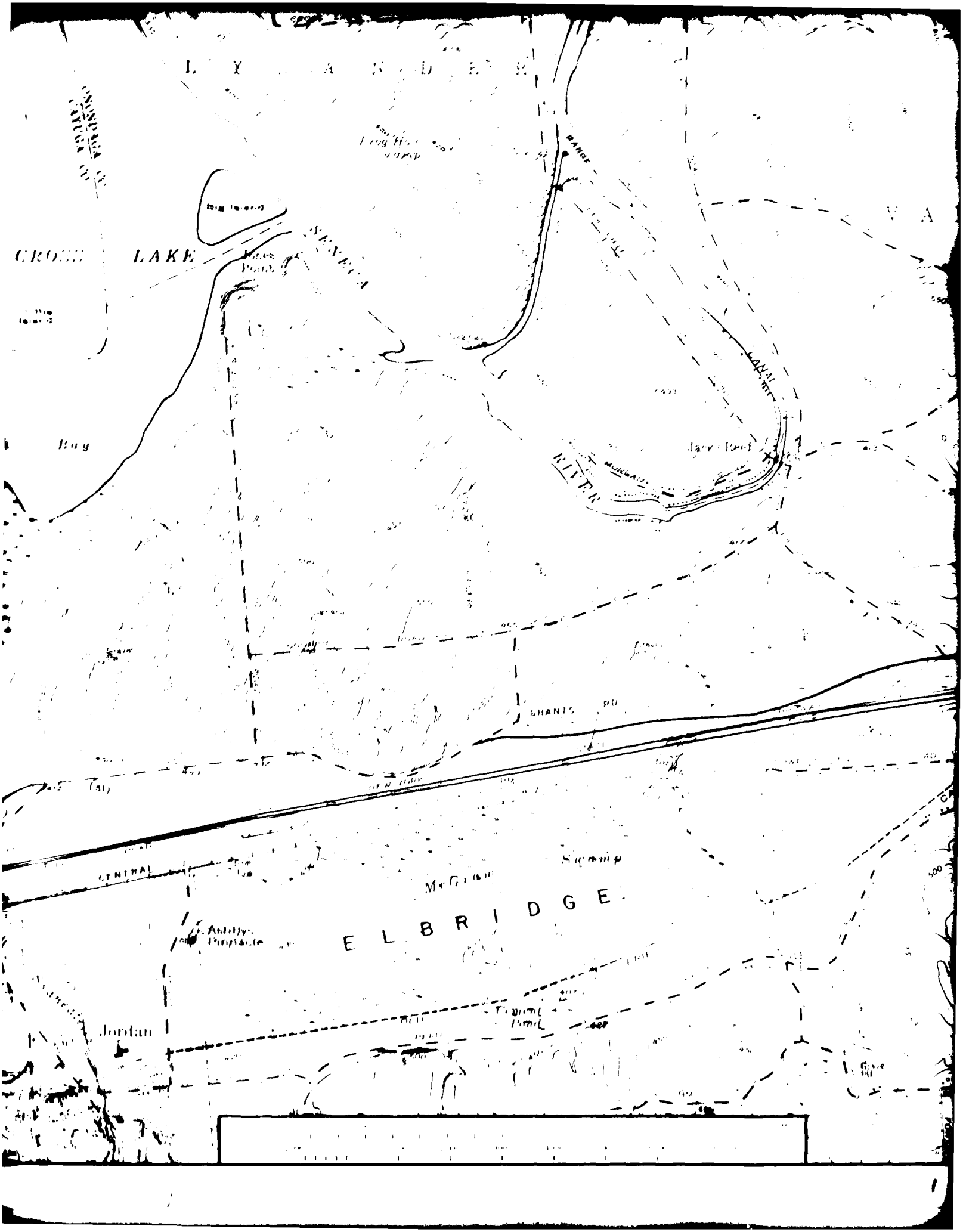
ARMY CORPS OF ENGINEERS BUFFALO

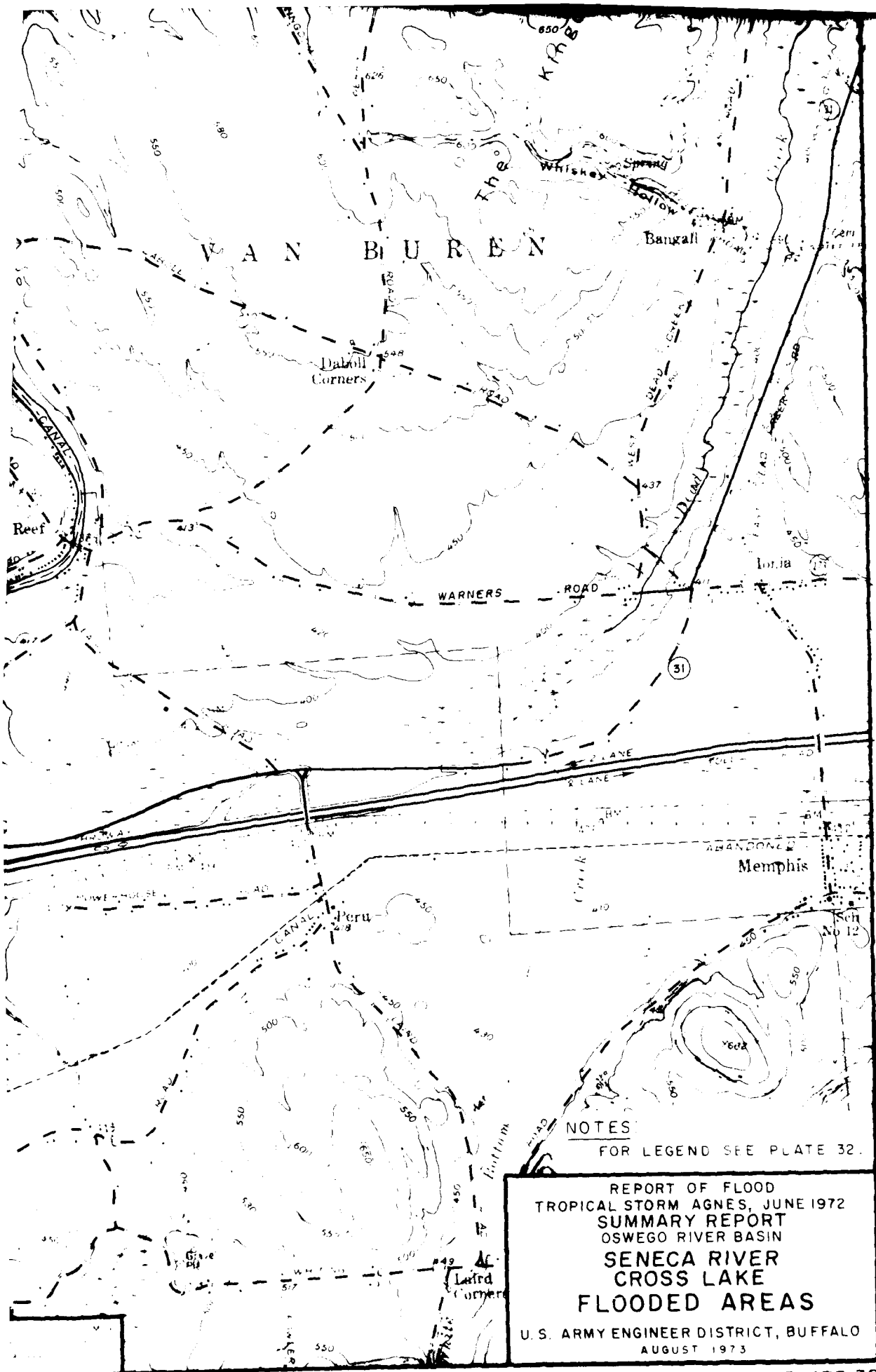
C A T O
ROAD
EVERTS RD.
SUGAR
ATLN
SHERMAN
ROAD
CROSS
Pembertons Point
Cornells Cove
C A T
ONONDAGA CO
CAYUGA CO
BRIDGE
ELAB CTR
370
380
430
463


Plainville
SENECA
RIVER
FLOW
GENESEE
WEST
ROAD
FENNER
RD.
VANN
LYNCH
KINGDOM
GATES
BARGE
SARAGLIE
CROSS
L Y S A N D E R
V A
The
Frog Hole
Swamp


FENNER RD.
VANN RD.
RM ROAD
RIVER
BARGE
CANAL
Maloney Island
Deady Creek
GUNBARREL
ROAD
KINGDOM
PERRY
VAN BUREN
LOVELESS
The Kingdom
WEST DEAD CREEK
RUNNERS
Whiskey Hollow
Bangall
BM
ROAD


Pembertons Point
C A T O
Cornells Cove
ONONDAGA CO
CAYUGA CO
CROSS LA
Little Island
South Bay
SLAB CITY
BRIDGE
ROAD
Seneca
CANAL
BONTA
JEROLEMON
BLUMER RD
RIVER
BARGE
ONONDAGA
CAYUGA
CO.
CO.
FLOW
RIVER
Cr
Skaneateles
Bonta Bridge
SENECA
2 LANE
PENN
CENTRAL
BM
389
BRUTUS
ERIE
CANAL
CLINTON
Jordan
Furnace Hill
Graver
31


LAKE
Bay
BARGE
CANAL
RIVER
SHANTY RD
CENTRAL
Swamp
ELBRIDGE
Jordan



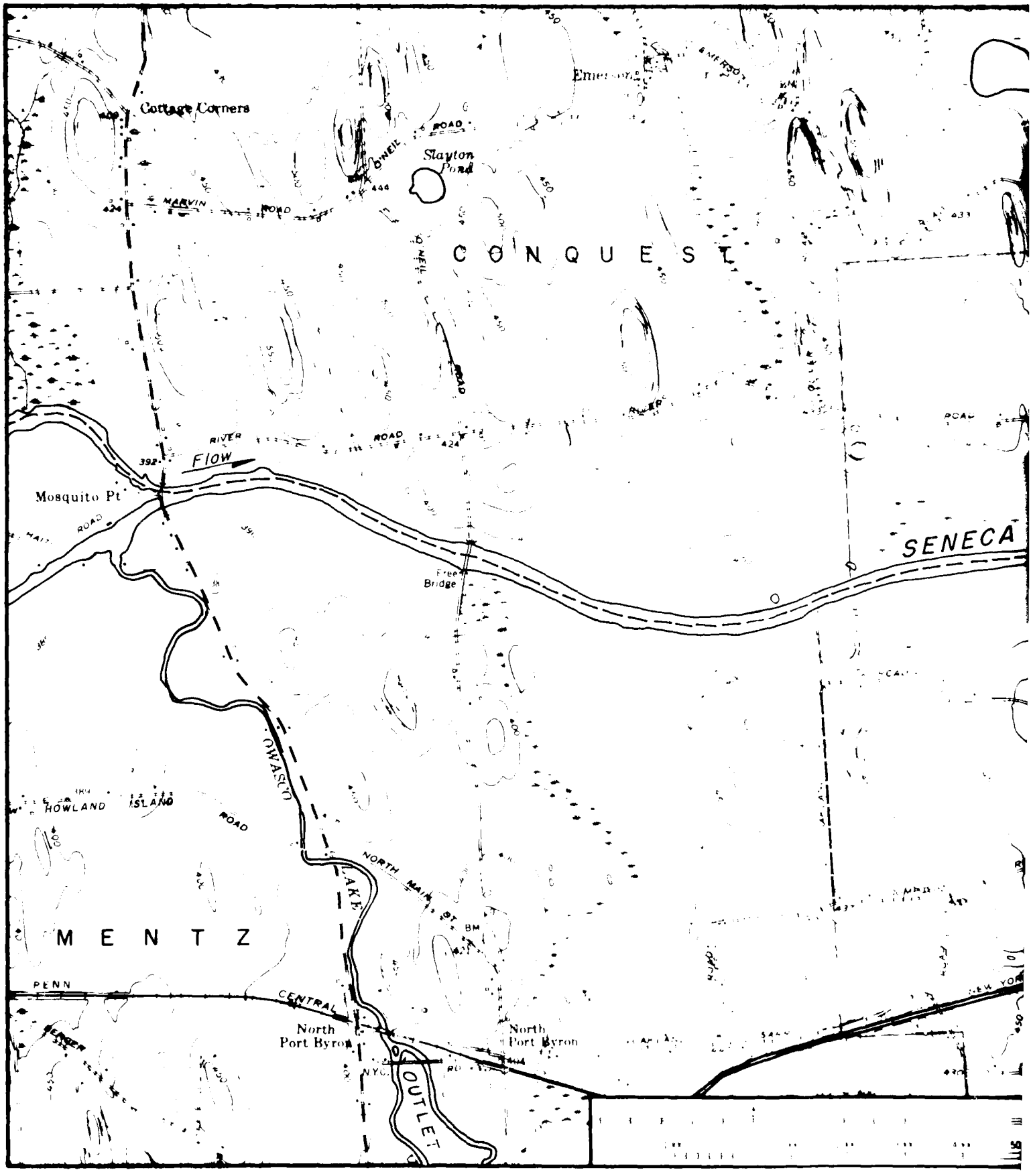
NOTES

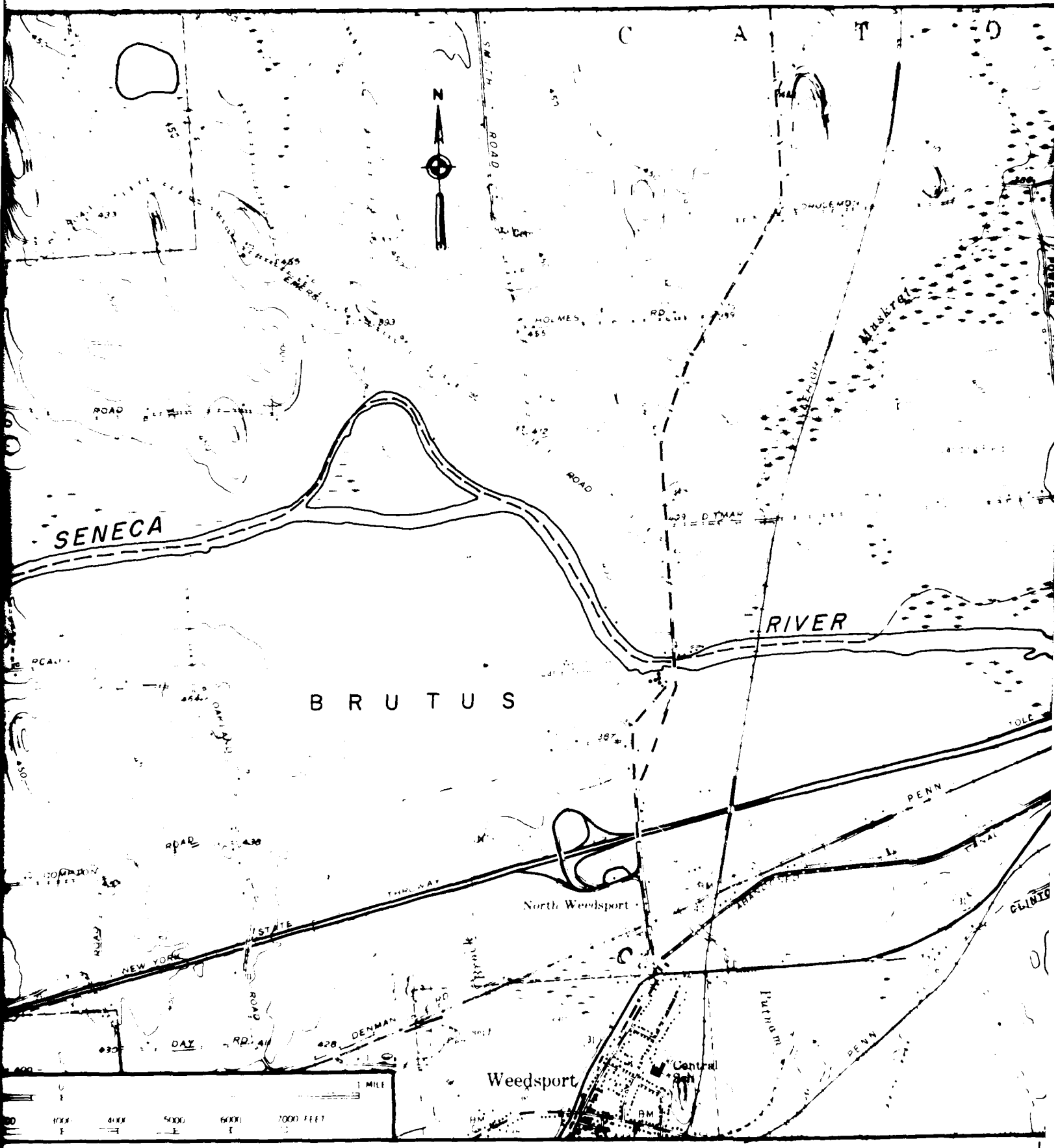
FOR LEGEND SEE PLATE 32.

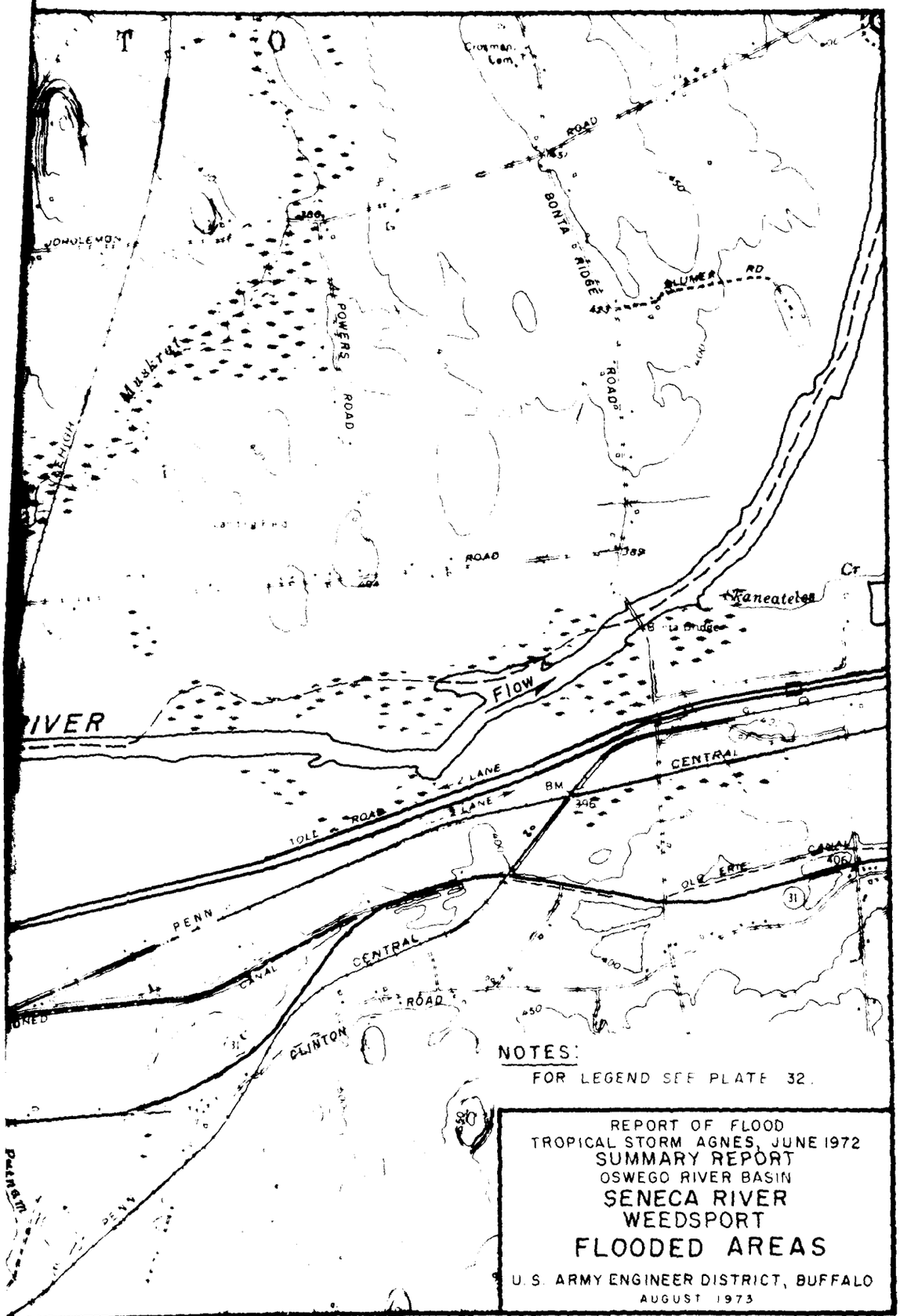
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN

SENECA RIVER
CROSS LAKE
FLOODED AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

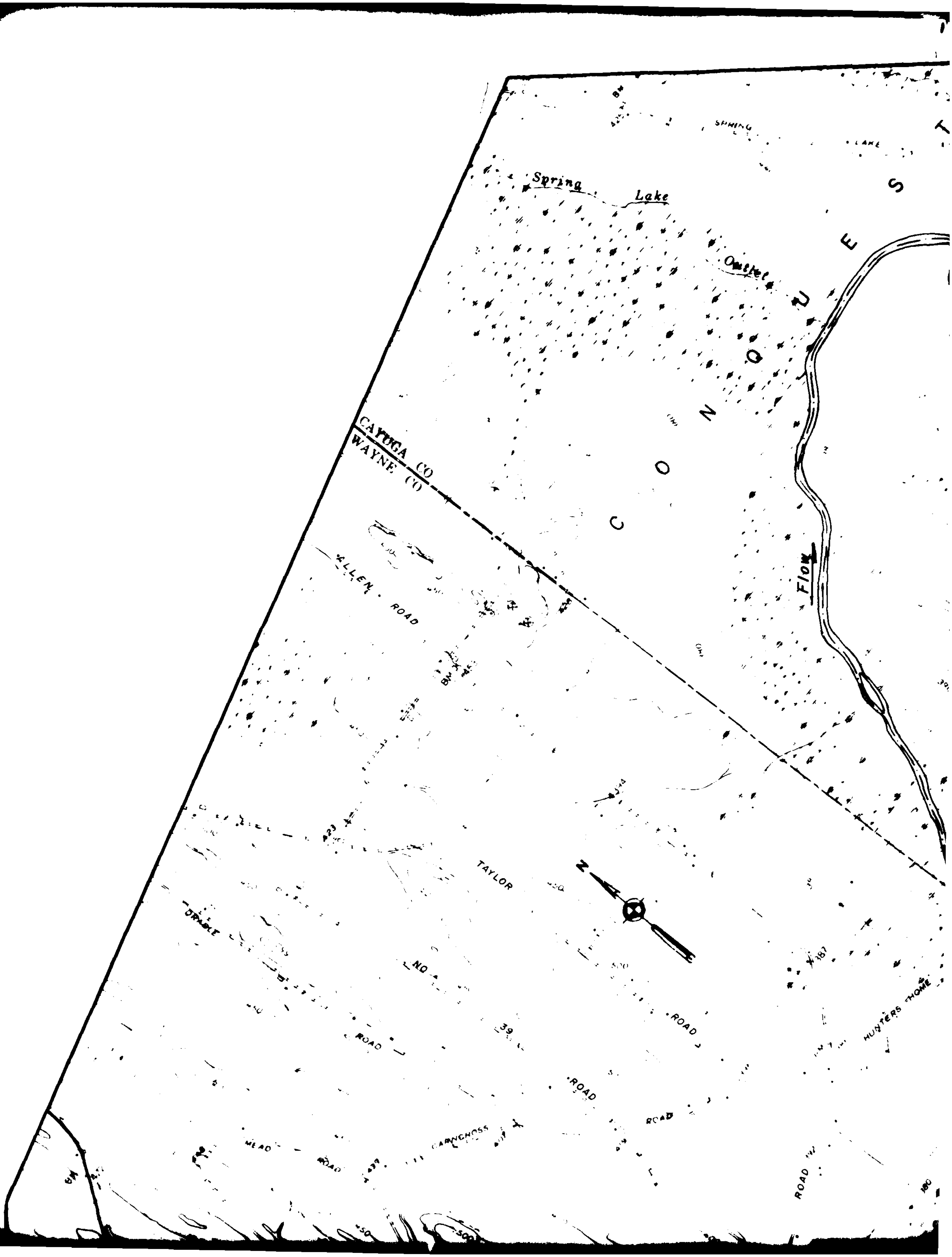

Cottage Corners
O'NEIL ROAD
Slayton Pond
MARVIN ROAD
CONQUEST
RIVER ROAD
FLOW
Mosquito Pt
MAIN ROAD
SENECA
Free Bridge
OWASCO
HOWLAND ISLAND ROAD
NORTH MAIN ST
LAKE
MENTZ
PENN CENTRAL
North Port Byron
North Port Byron
OUTLET


N
SENECA
RIVER
B R U T U S
North Weedsport
Weedsport
Central Sch
ROAD
HOLMES RD.
DENMAN
DAY RD.
NEW YORK STATE THRUWAY
PENN
PENN
1 MILE
1000 FEET
2000 FEET
3000 FEET
4000 FEET
5000 FEET
6000 FEET
7000 FEET



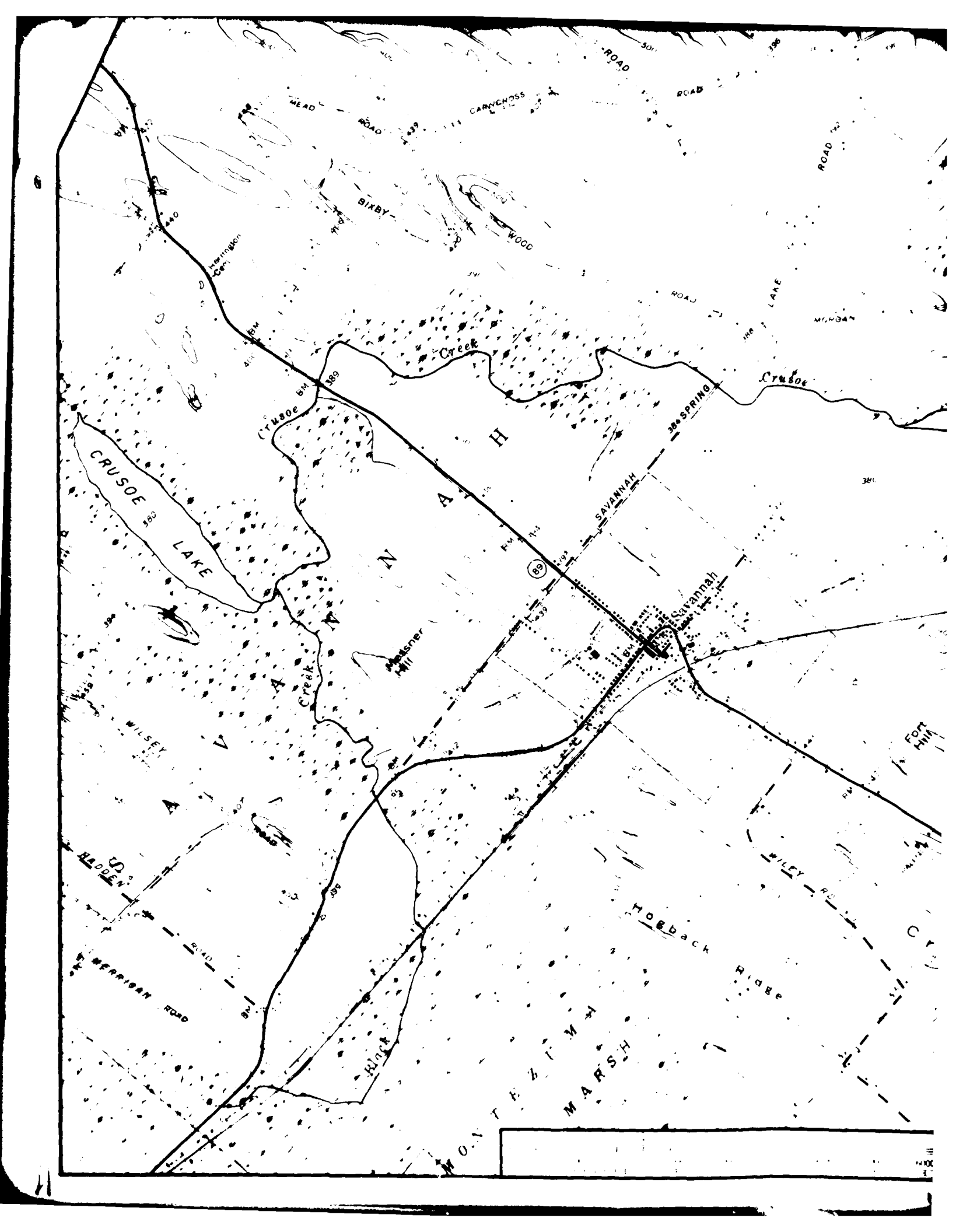
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN
SENECA RIVER
WEEDSPORT
FLOODED AREAS

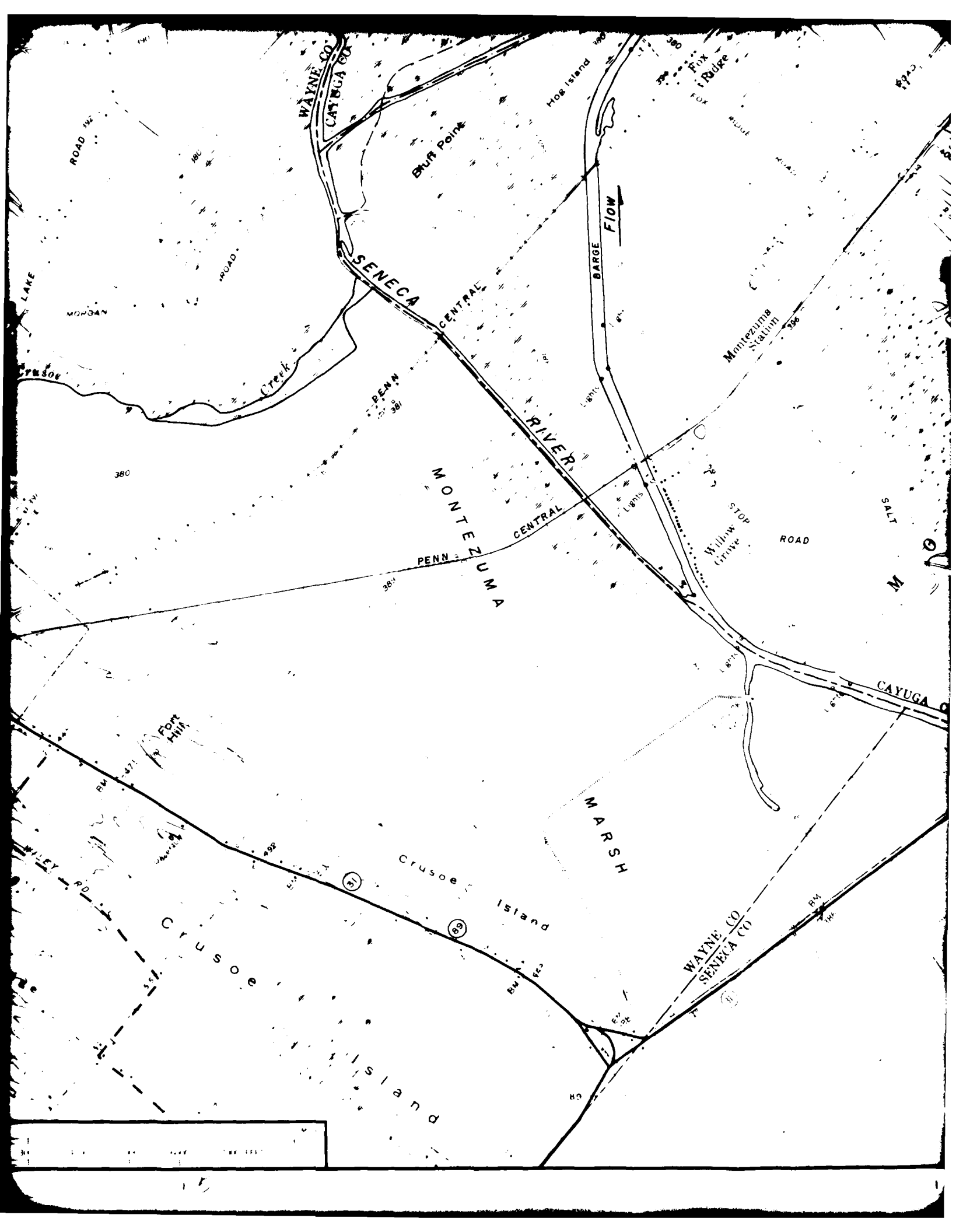
U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

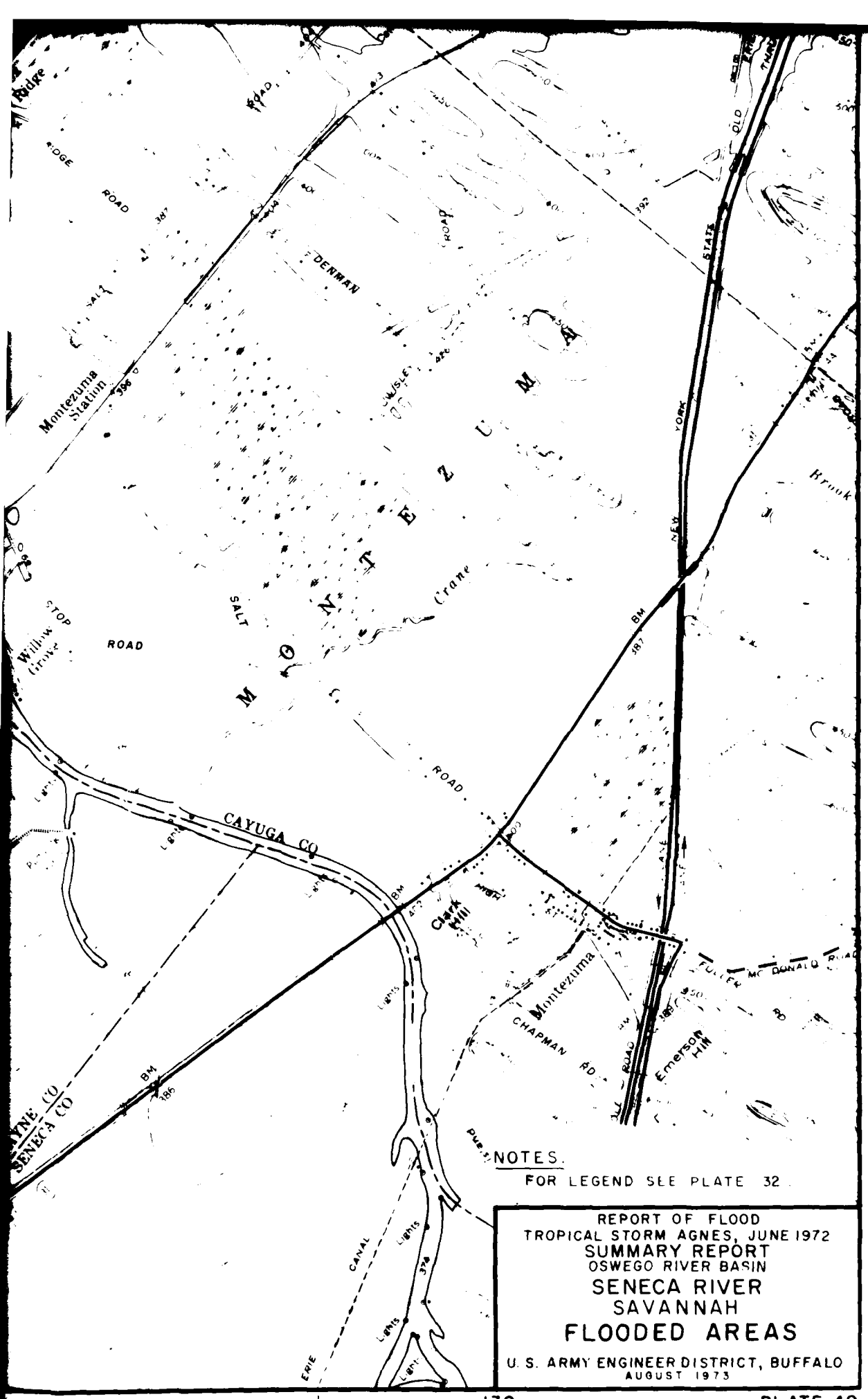

Spring Lake
Outlet
SPRING
LAKE
C O N Q U E S T
CAYUGA CO
WAYNE CO
Flow
ALLEN ROAD
TAYLOR
ROAD
ROAD
ROAD
ROAD
HUNTERS HOME
MEAD
ROAD
ROAD
N

E S T
SENECA
RIVER
CANAL
Flow
Hard Point
Island
Mosquito Pt.
BARGE
Haiti
HOWLAND ISLAND
GAME REFUGE
Howland
BM
Island Bridge
High Ridge
Eagle Hill
Camel Island
Hickory Hill
HUNTERS HOME
ROAD
WAYNE CO.
CAYUGA CO.
CANAL
Hog Island
Fox Ridge
Bluff Point
FOX
RIDGE
ROAD
Light
Lights
Fixed Bridge
OWASC


FLOW
Free Bridge
ROAD
OWASCO
LAKE
NORTH MAIN ST
North Port Byron
North Port Byron
OUTLET
HOWLAND ISLAND
BERGER
LANE
THOMPSON
MAIDEN
ROAD
High Bridge
ROAD
ROAD
ROAD
ROAD
ROAD
ROAD
ERIE CANAL
STATE
Z
N
M


ROAD
MEAD
ROAD
CARNOCOSS
ROAD
BIXBY
WOOD
ROAD
LAKE
MICHIGAN
Creek
Crusoe
SPRING
CRUSOE
LAKE
SAVANNAH
Savannah
Meisner
Hill
Creek
WILSEY
Fort
Hill
HARDEN
ROAD
HARRISON ROAD
Hoeback
Ridge
MONTGOMERY
MARSH
A
V
A
N
N
A
H

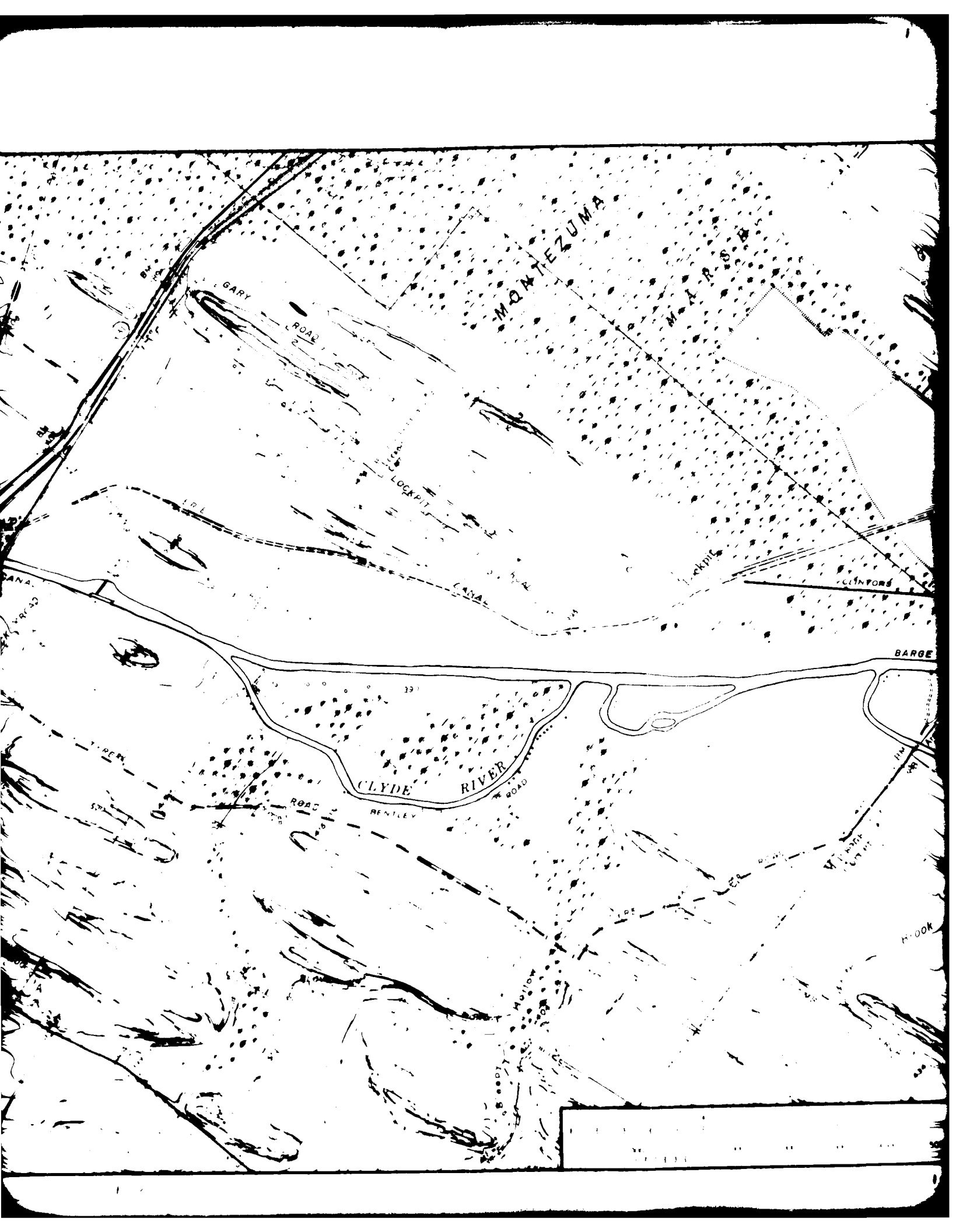

WAYNE CO
CAYUGA CO
Hog Island
Fox Ridge
Bluff Point
ROAD
LAKE
MORGAN
ROAD
SENECA
CENTRAL
BARGE
FLOW
Montezumia Station
Crusoe
Creek
PENN
CENTRAL
RIVER
MONTEZUMA
Lights
STOP
Willow Grove
ROAD
SALT
PENN
CENTRAL
CAYUGA
Fort Hill
MARSH
Crusoe Island
WAYNE CO
SENECA CO
Crusoe Island



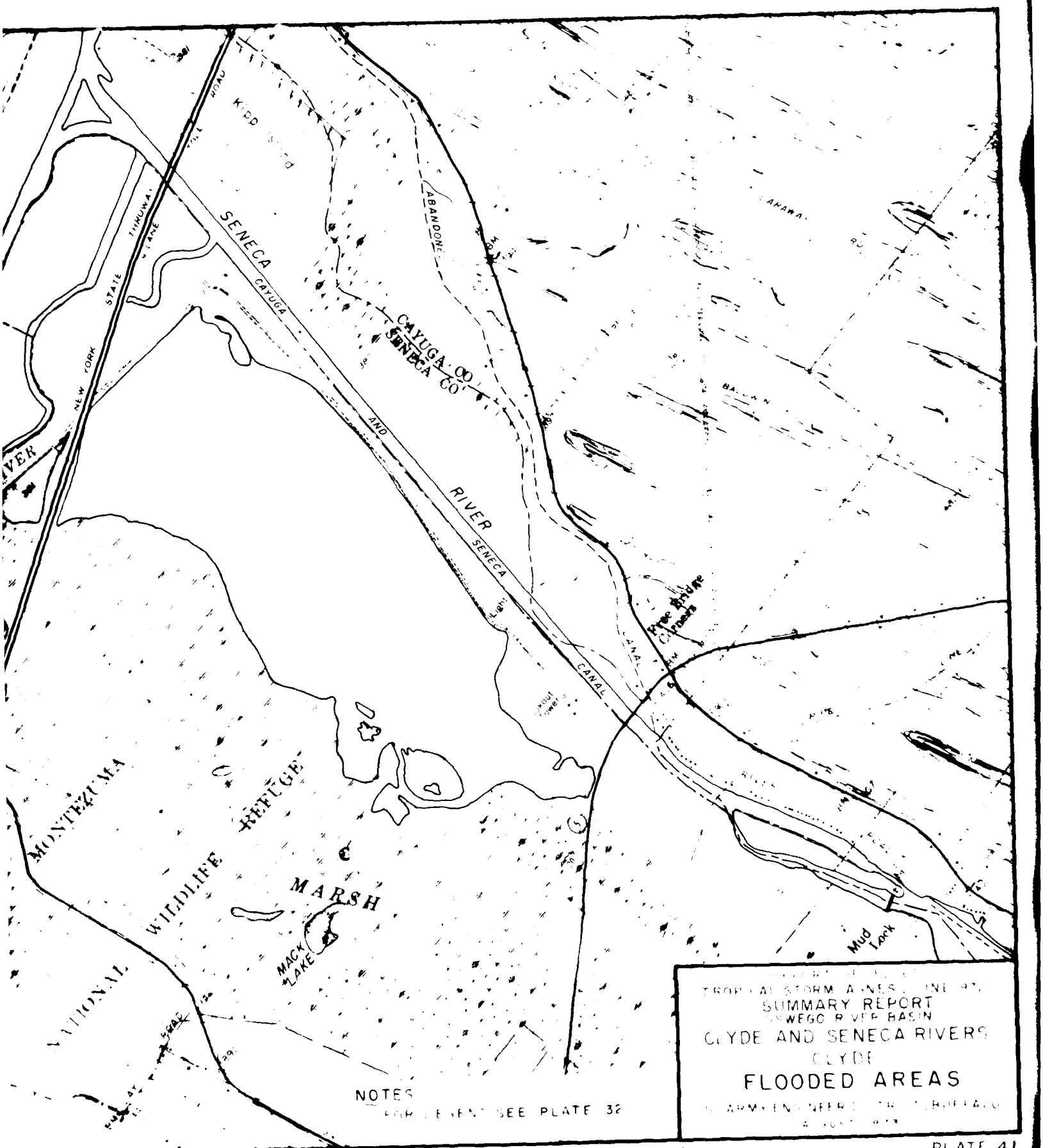
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN
SENECA RIVER
SAVANNAH
FLOODED AREAS

U. S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973


BARGI

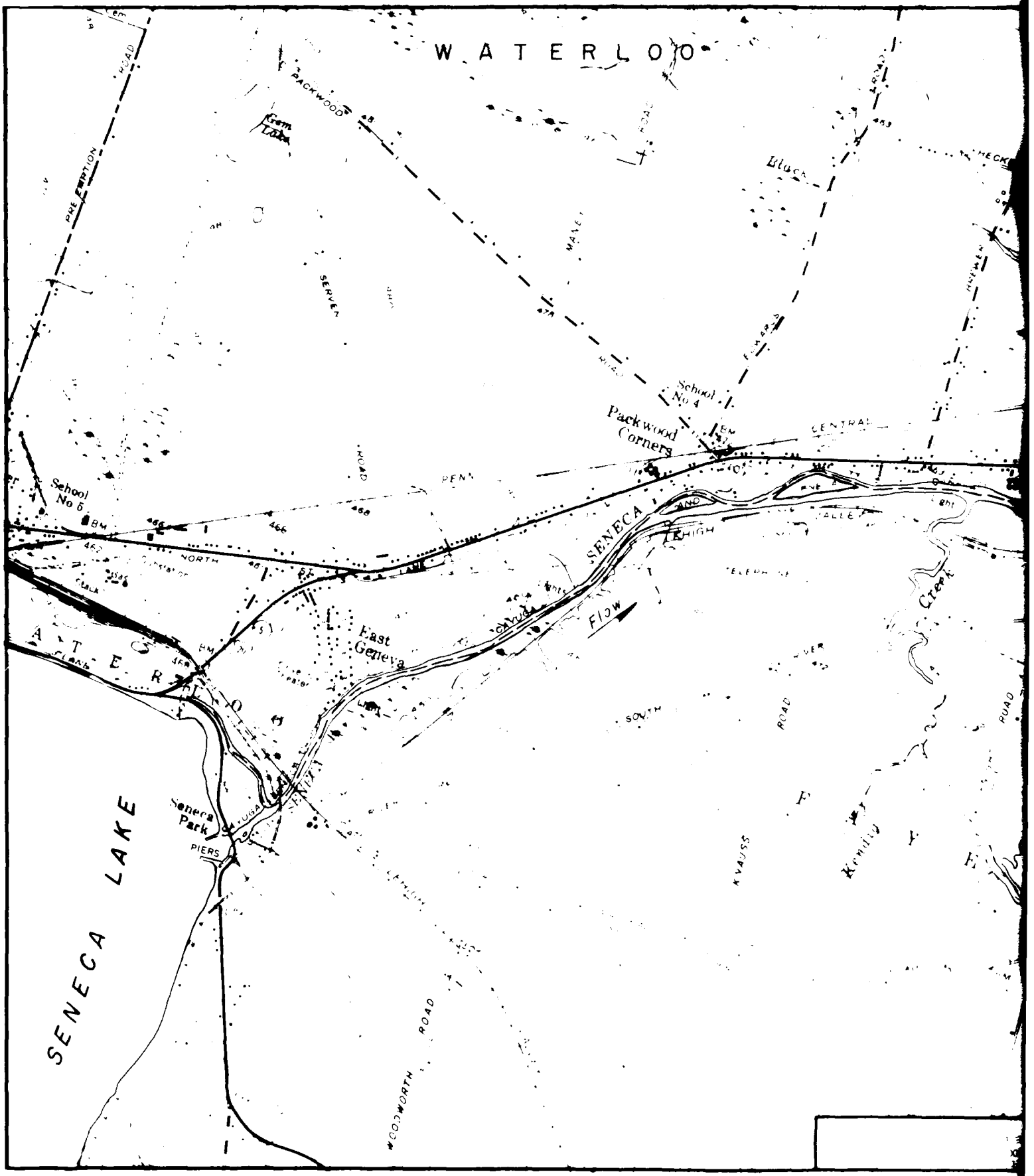

MONTEZUMA
MARSH
GARY
ROAD
LOCKPIT
CANAL
BARGE
CLYDE
RIVER
ROAD
BENTLEY
ROAD


T Y R E
ARMITAGE
DITCH
BARGE
CANAL
CLYDE
RIVER
MONTEZUMA
GRAVEL
BARGE
CANAL
RIVER
CLYDE
90

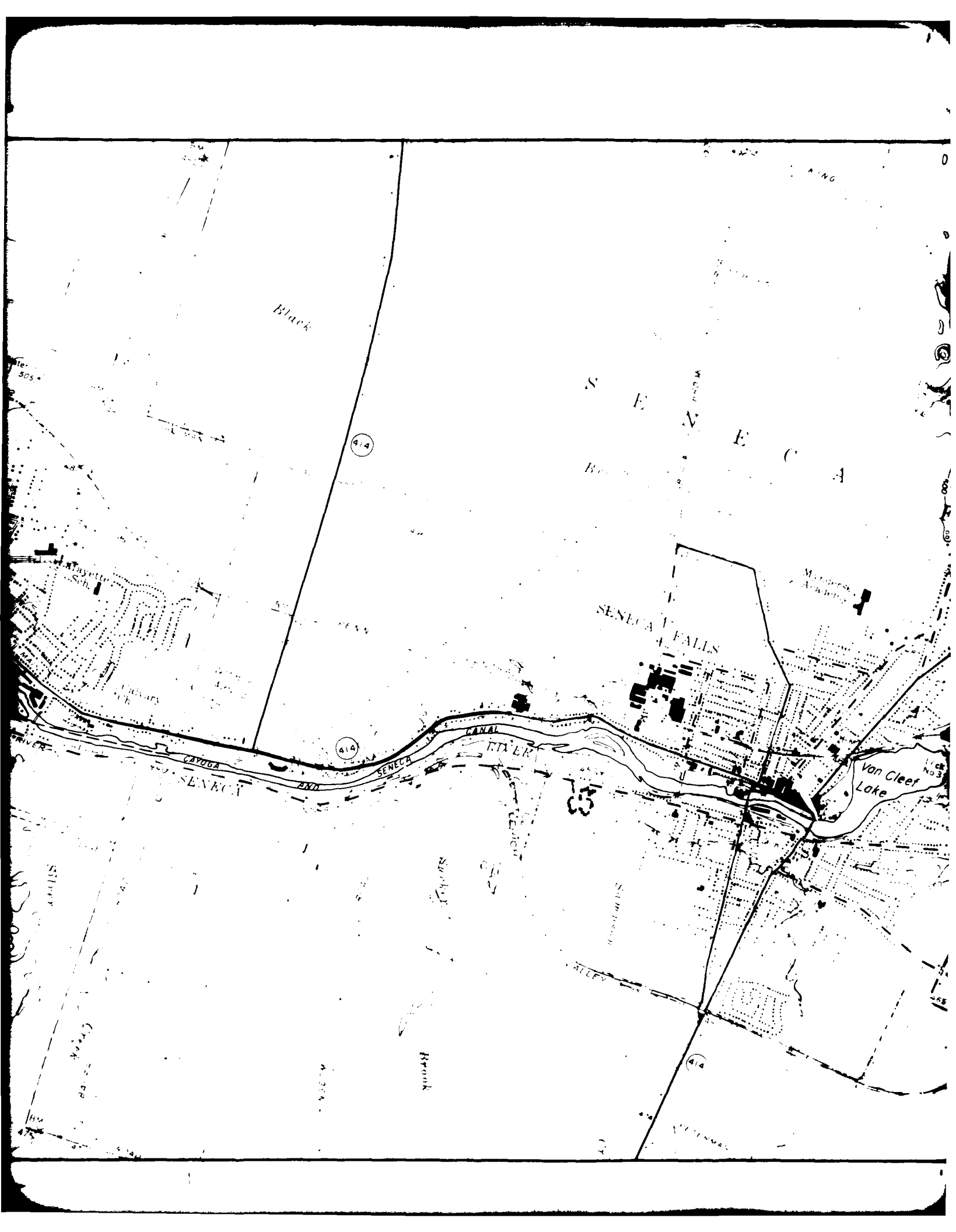


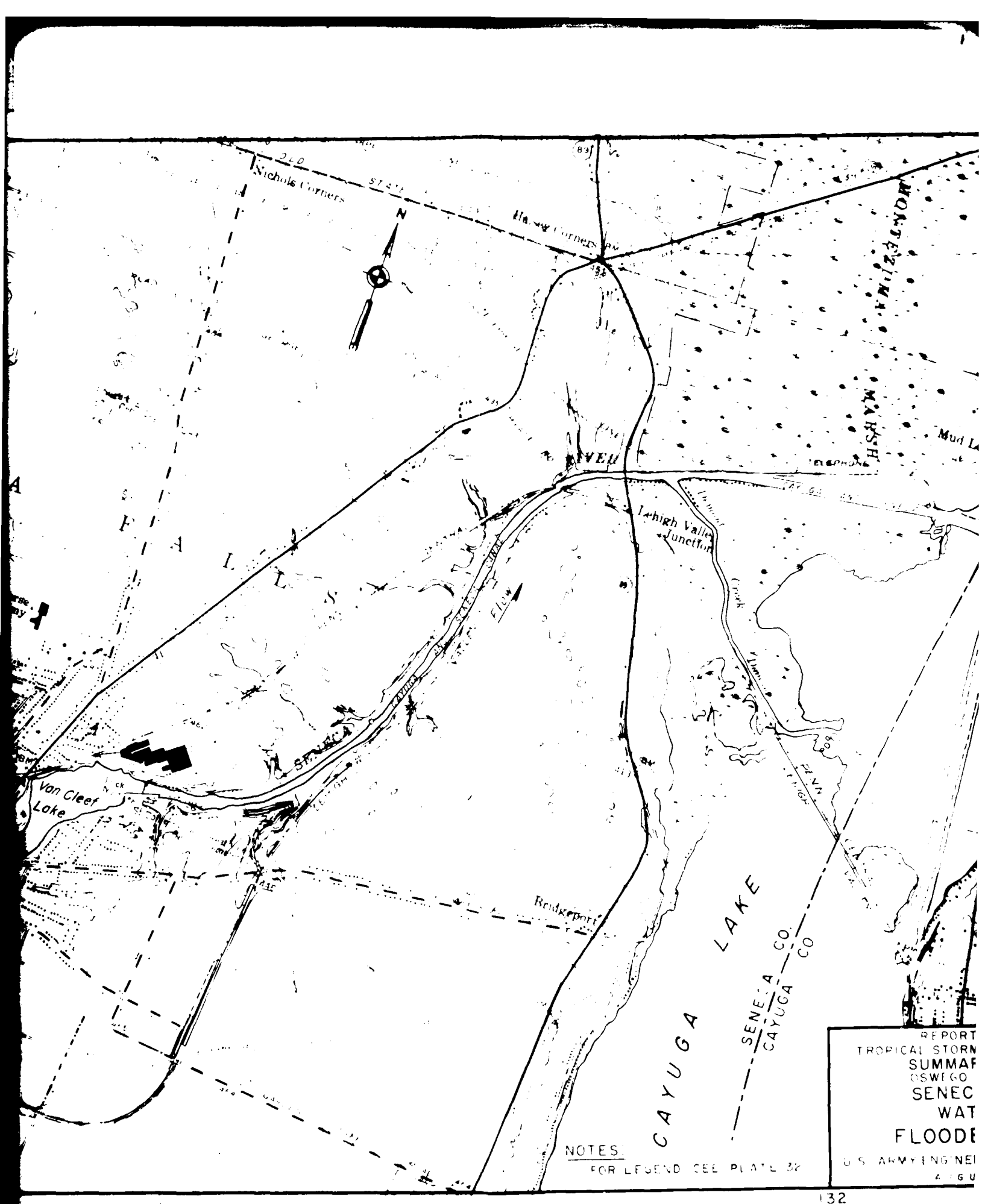
TROPICAL STORM AGNES, JUNE 72
SUMMARY REPORT
OSWEGO RIVER BASIN
CLYDE AND SENECA RIVERS
CLYDE
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1972

PLATE 41


WATERLOO
SENECA LAKE
Packwood Corners
School No 4
School No 6
East Geneva
Seneca Park
PIERS
Flow
SENECA
Creek
PACKWOOD
ROAD
SOUTH
NORTH
PENN
CENTRAL
LEHIGH
VALLEY
WOODWORTH ROAD


WATERLOO
RIVER
Creek
ROAD
Light
Water
Marshall
Sandy
Skill Farm
Sch.


SENECA
SENECA FALLS
Von Cleef Lake
CAYUGA AND SENECA CANAL
RIVER
414
Black


Nichols Corners
STATE
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N
MONTEZUMA
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Mud L
RIVER
Lehigh Valley
Junction
Creek
Van Cleef
Lake
SENECA
Bridgeport
CAYUGA LAKE
SENECA CO.
CAYUGA CO.
REPORT
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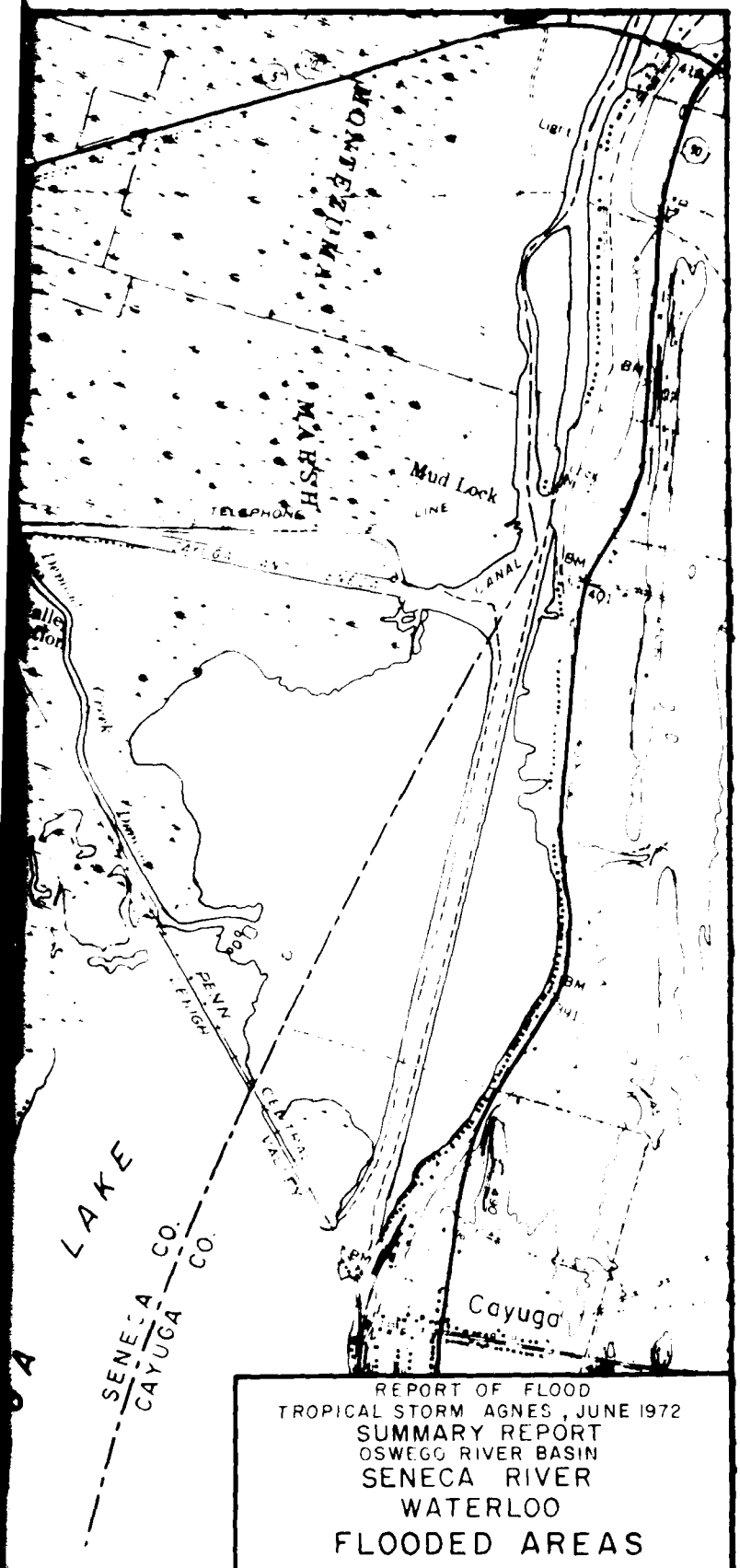
FLOODI
U.S. ARMY ENGINEI
NOTES:
FOR LEGEND SEE PLATE 32

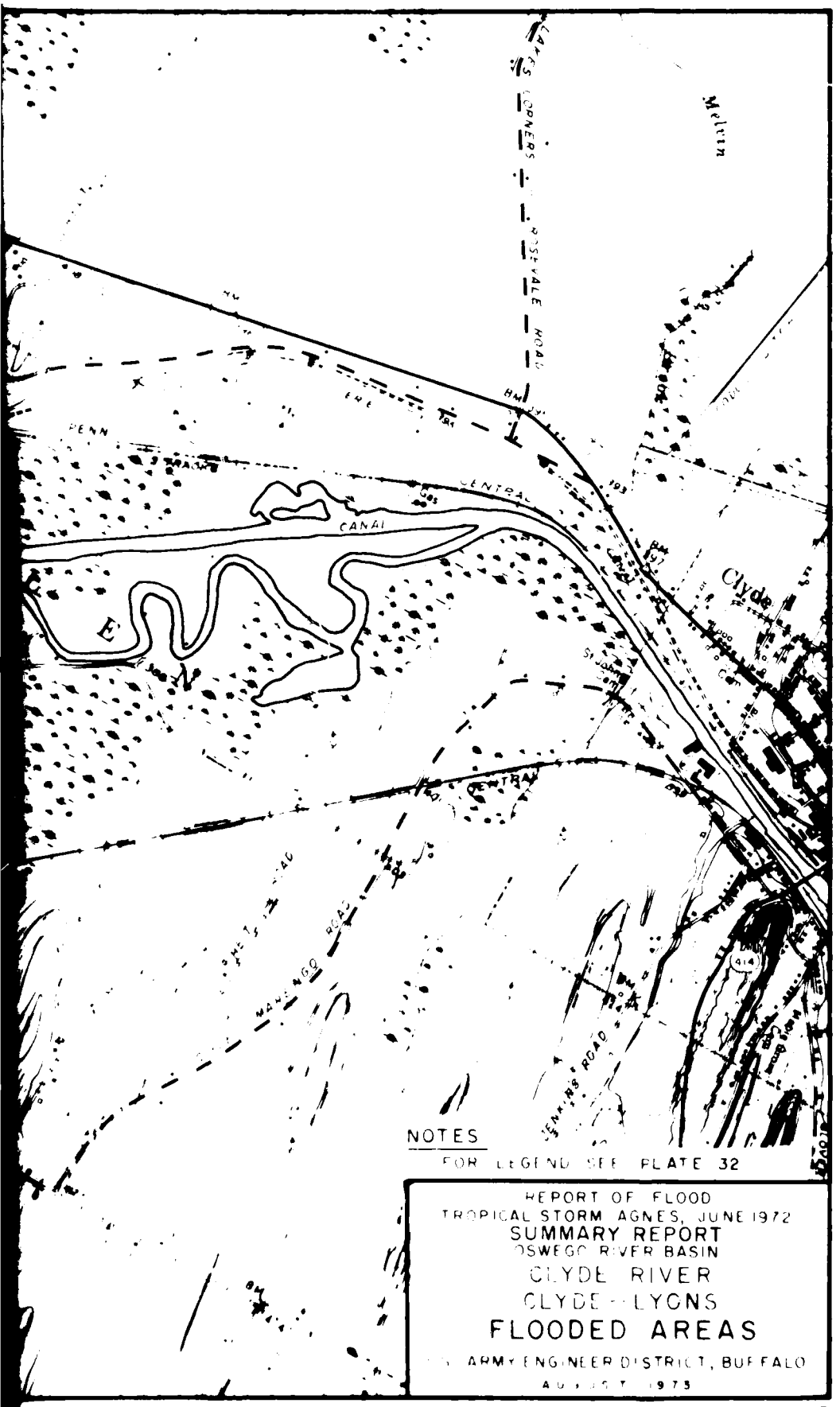


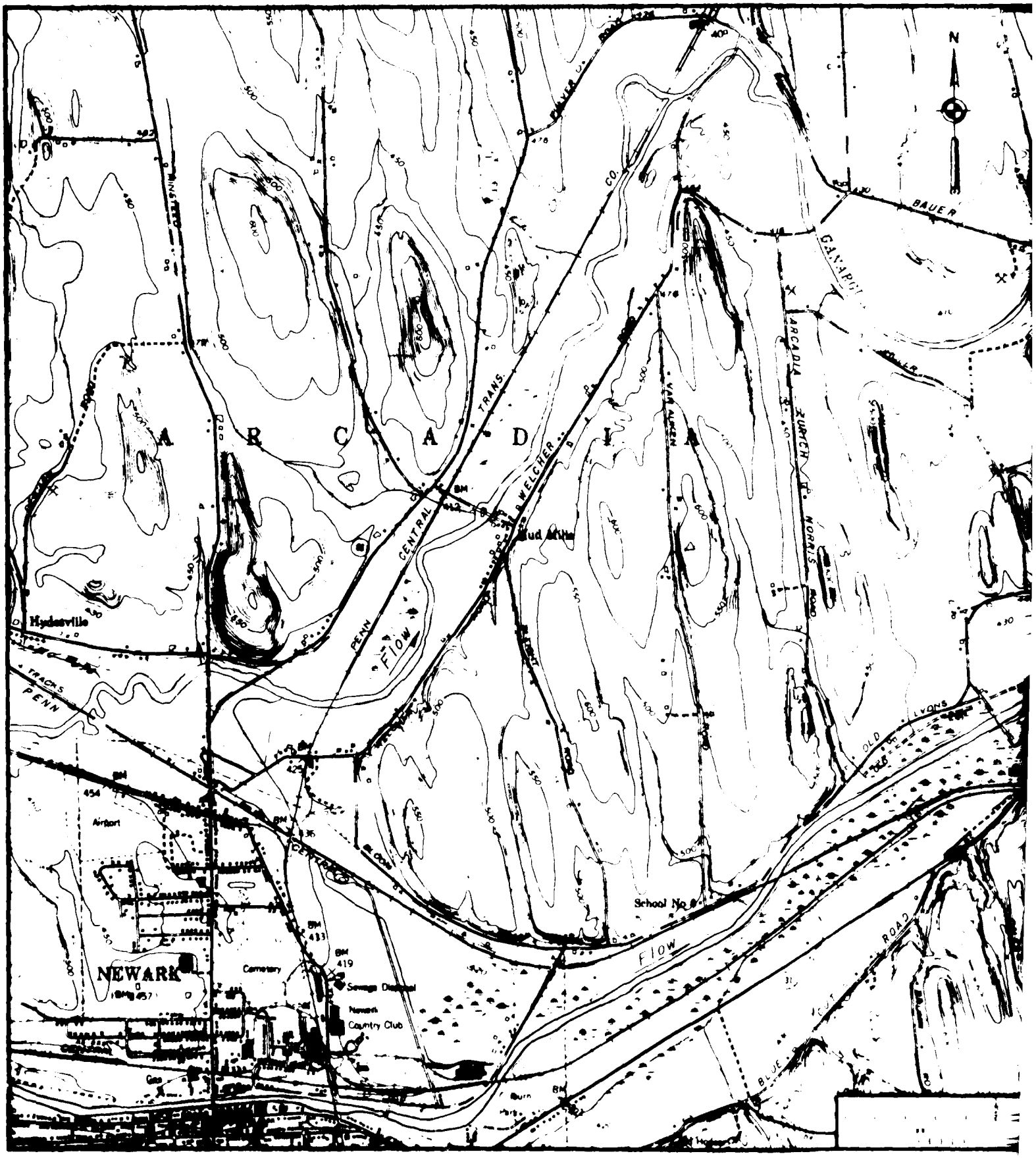
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN
SENECA RIVER
WATERLOO
FLOODED AREAS
U S ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

SEE PLATE 32

LYONS
OUTLET
CANANDAIGUA
Flow
LYONS
Allenway
WAYNE CO.
ONTARIO CO.
PENN
CENTRAL
CANAL
DUBLIN
BROOK
PRE EMPTION
ROAD


N
BARGE
FLOW
RIVER
ROAD
FLOW
CLYDE


NOTES
FOR LEGEND SEE PLATE 32
REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
SUMMARY REPORT
OSWEGO RIVER BASIN
CLYDE RIVER
CLYDE - LYONS
FLOODED AREAS
ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973


N
BAUER
GANAPH
ARCADIA
RUNYON
NORRIS ROAD
VAN ALKEN
FLETCHER
TRANS.
CENTRAL
PENN
FLOW
Mud Mills
Hydesville
TRACKS
PENN
OLD
LYONS
ROAD
Airport
454
NEWARK
Cemetery
Sewage Disposal
Newark
Country Club
School No. 6
BLUE
Gas
Burn
BM
419
433

N
BAUER
Lyons Rural Cem
Butterfield
ROSS
ROAD
CREEK
NEWARK
BARGE
CANAL
DRY DOCK
OLD
LYONS
Co County Home
GANZ
ERIE
CANAL
PENN
CANAL
WINK
ROAD
ROAD
CANANDAIGUA
OUTLET
Y O N S
L Y


Pilgrimport
LOCK CLINTON 8
BERLIN ROAD
GREEN
L A Y D N
STORMS RD
PILGRIM ROAD
LYONS
BM 491
CENTRAL
PENN
TRACKS
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REPORT OF FLOOD
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NEW YORK STATE BARGE CANAL
LYONS
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973
OUTLET


P A L M Y R A
CREEK
Johnson
BARGE
Bowell Hill
Galloway
Hill
FLOW


FLOW
CREEK
PENN
MYDESVILLE
TRACKS
TRANS PENN CO.
PENN
TRACKS
CANAROGA
STEBBINS
PENN
CANAL
CENTRAL
FLOW
BARGE
THE
WIDE
WATERS
HOGBACK
HILL
N

REPORT OF FLOOD
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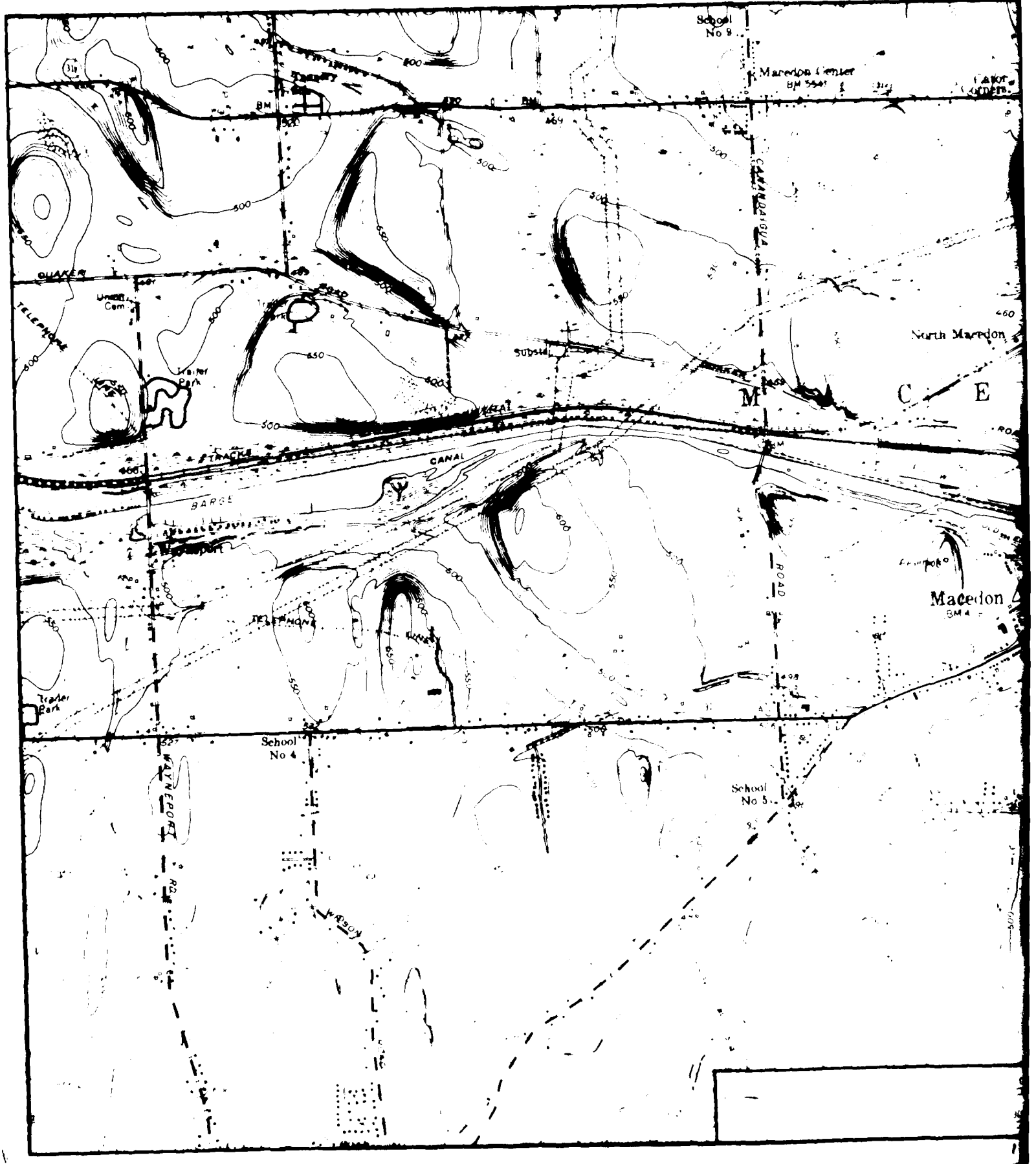
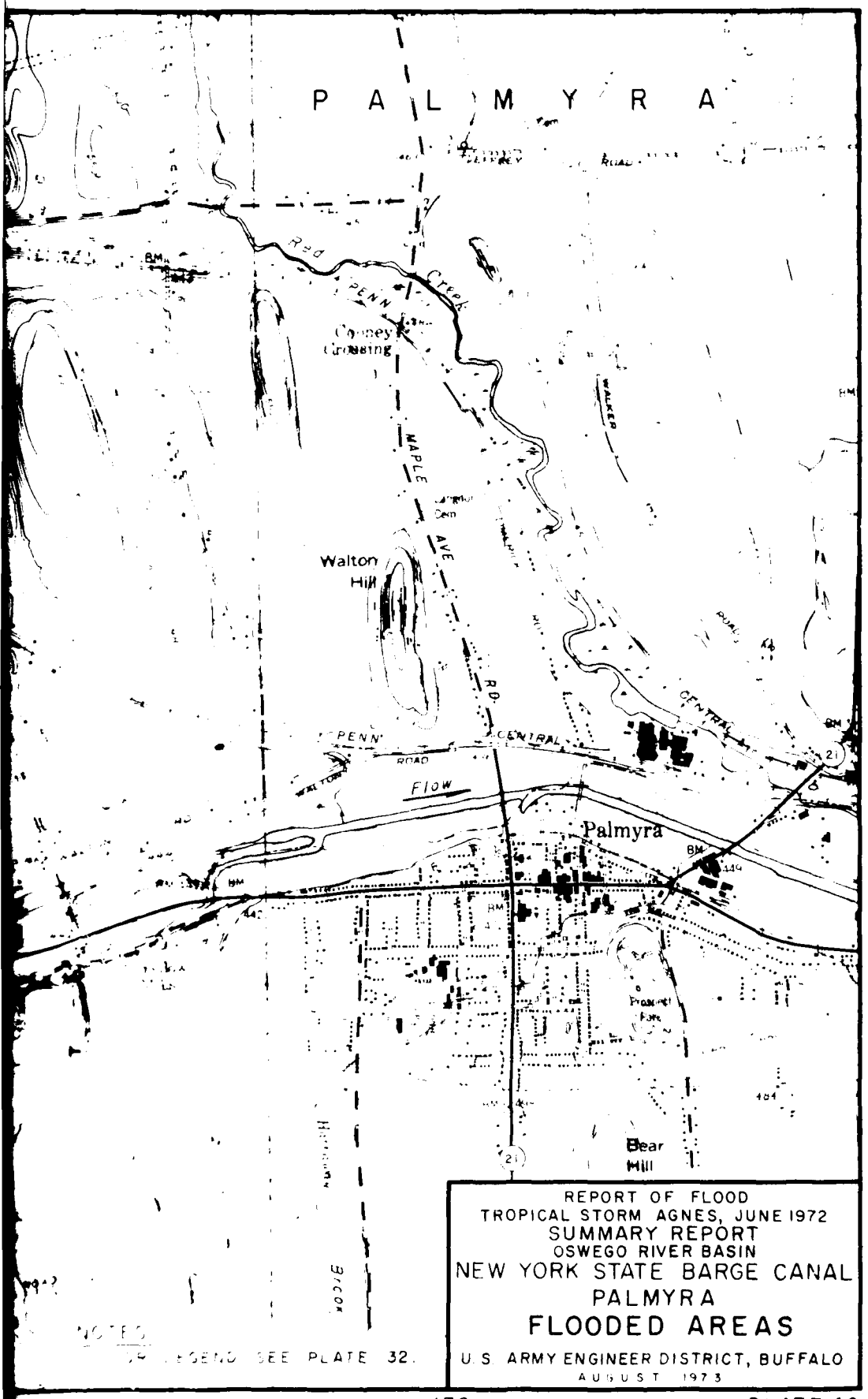
SUMMARY REPORT
OSWEGO RIVER BASIN
NEW YORK STATE BARGE CANAL
NEWARK
FLOODED AREAS
U S ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973


School
No 9
Macedon Center
BM 554
North Macedon
M C E
CANANDAIGUA
QUAKER
TELEPHONE
Trailer
Park
Subsid
RAILROAD TRACKS
CANAL
BARGE
Macedon
BM 4
ROAD
School
No 4
School
No 5
MAYNEFORD
RD
HARTSON


Science Hill
Science
Hill
Walworth
Station
North Macedon
C E D O N
N
Macedon
BM 418
GANARGUA
BARGE
CANAL
CREEK
Yellow
Mills
ROAD
School
No 1
NOTES



REPORT OF FLOOD
TROPICAL STORM AGNES, JUNE 1972
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OSWEGO RIVER BASIN
NEW YORK STATE BARGE CANAL
PALMYRA
FLOODED AREAS
U.S. ARMY ENGINEER DISTRICT, BUFFALO
AUGUST 1973

NOTES
FOR LEGEND SEE PLATE 32.

NORTHEAST OHIO

General

The primary damage area from Tropical Storm "Agnes" was approximately 125 miles of Lake Erie shoreline in Ashtabula, Cuyahoga, Lake and Lorain Counties. Storm damage was greatest in the built-up areas of Cleveland and Lorain. The remainder of the shoreline has many homes and cottages. Storm damage occurs when strong winds produce high lake stages and accompanying high wave activity. Flooding near the mouth of the river may occur from storm runoff or high lake stages as described above. Residential, industrial and commercial establishments account for most damage in cities and farmland in other parts of the counties.

Big Creek is a tributary of the Cuyahoga River with a drainage area of 37.6 square miles. The Creek flows northerly for eight miles then easterly for four miles and joins the Cuyahoga River 4.5 miles from Lake Erie. A narrow flood plain is confined by steep valley walls and has a relatively steep stream slope averaging 23.4 feet per mile. The development in the flood plain along Big Creek, near the confluence with the Cuyahoga River, is commercial and industrial in character. The Cleveland Zoo and Brookside Park are located between stream mile 1.5 and 2.5 where major flood problems begin on Big Creek. The lower two miles of the Creek are subject to increased flooding due to urbanization of the headwater area of the basin. The increased runoff cannot pass through the buried conduits just upstream of the zoological park and results in more frequent flooding within the park.

Damages

After the storm, personnel from the Corps of Engineers, Cleveland Resident Office prepared damage survey reports for the Office of Emergency Preparedness by interviewing various public officials and government agencies. Public damage was assessed by inspection of the damage survey reports. The Small Business Administration provided residential and commercial damage for Ashtabula, Cuyahoga, Lake and Lorain Counties. A summary table of these damages are listed in Table 30. Land erosion along the lake is not included in the damage estimates. A description of the storm and damages along the Lake Erie shoreline are given in the following paragraphs.

Tropical Storm "Agnes" damaged much of Ohio's northeastern Lake Erie shoreline during the period 22-24 June 1972. Strong WNW winds with associated waves, and localized heavy rainfall resulted in local flooding and wave damage to shoreline areas. The most extensive damage being done in the Counties of Cuyahoga and Lake.

The storm began on the morning of the 22nd with heavy rainfall continuing through the morning of the 23rd centered over the Big Creek Watershed in Cleveland. Plate 2 shows the total storm isohyetal map using N.W.S. data. The average rainfall over the basin for one day was approximately 4.0 inches. The excessive runoff caused flooding in the lower three miles of Big Creek starting at 8 a.m. until noon on the 24th of June. Figure 41 shows the results of the flood at the Zoo. The conduits upstream of the Cleveland Zoo were inadequate to handle the flood flows resulting in 2-3 feet of water over 40 percent of the Zoo grounds. The water level was about 6 inches above the 1959 flood stage. Approximately $28,000 damage was done to equipment for clean up, and loss of a goat exhibit. Other areas subject to flooding on Big Creek were Brookside Park, Fanner Manufacturing, Protector Manufacturing Inc., and in the vicinity of Valley and Jenning Roads. Many other small creeks were flowing bank full. Numerous roads were flooded for up to 10 hours due to inadequate local drainage.

Wind speeds averaged 40 mph with gusts up to 60 mph from the WNW for a 30-hour period starting midday on the 22nd and were reported at two locations in the Cleveland area. Wind-driven waves up to 15 feet in height and high lake levels accounted for the majority of the total storm damage. Many private and public erosion protection structures were damaged or destroyed.

The City of Cleveland had over $2,000,000 damage to public utilities, roads, and for debris clean-up. Public utilities include the east and west breakwalls in Cleveland Harbor that suffered heavy damage in some sections, shown in Figures 42 and 43. Severe damage was done to the diked containment areas for dredge disposal materials located in the Cleveland Outer Harbor. The Corps of Engineers, Cleveland Boatyard Office docks were damaged by wave action and by the movemen of the pieces of floating plant moored adjacent to the docks. The ities of Lorain and Conneaut suffered $100,000 and $58,000 da ge, re pectively, to highways and publicly-owned facilities.

Most of the land owners on the lake suffered damage om the storm. The majority of commercial damage was to marinas. Many marinas suffered heavy losses to docks, breakwalls, and boats from large waves. Approximately 100 boats were destroyed and hundreds more damaged. Residential damage was heaviest in Eastlake. Figures 44 through 46 show the results of the storm in Eastlake. Five homes were completely destroyed and a number of others suffered moderate damage. Along the coast almost all docks were destroyed. Boats and boat houses felt the force of the waves. High lake levels combined with a moderate stage on the Chagrin River in Eastlake resulted in first floor flooding.

Table 30. - Total Estimated Damage from the June 1972 Flood in Ohio Within the Buffalo District

Location	Private(1)	Public & Other	Agricultural	Total
	$	$	$	$
Ashtabula County, OH	210,000	410,000 (3)	(2)	620,000
Cuyahoga County, OH	881,000	3,950,000 (3)	(2)	4,831,000
Lake County, OH	378,000	60,000 (3)	(2)	438,000
Lorain County, OH	459,000	470,000 (3)	(2)	929,000
TOTAL	1,928,000	4,890,000 (3)	(2)	6,818,000

(1) Includes residential, industrial and commercial damage.
(2) Insignificant.
(3) Includes damage to harbor structures.

Figure 41 Flood damage to a maintenance building at the Cleveland Zoo. Photo taken 27 June 1972.

Figure 42 Damage to Outer Cleveland Harbor east breakwall. Photo taken looking lakeward, 27 June 1972.

Figure 43 Damage to Outer Cleveland Harbor west breakwall. Photo taken looking east, 27 June 1972.

[illegible] subject to wave action at Finfrock Blvd. East Lake, OH. Note bank erosion at the left [illegible]

Lake of Isles. Rip rap stone placed by Lakeshore owners as shore protection.